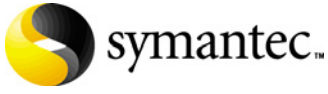
Symantec LiveState™ Recovery Advanced & Standard Server Implementation Guide



Symantec LiveState™ Recovery 3.0 Implementation Guide

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Technical support

As part of Symantec Security Response, the Symantec global Technical Support group maintains support centers throughout the world. The Technical Support group's primary role is to respond to specific questions on product feature/function, installation, and configuration, as well as to author content for our Web-accessible Knowledge Base. The Technical Support group works collaboratively with the other functional areas within Symantec to answer your questions in a timely fashion. For example, the Technical Support group works with Product Engineering as well as Symantec Security Response to provide Alerting Services and Virus Definition Updates for virus outbreaks and security alerts.

Symantec technical support offerings include:

- A range of support options that give you the flexibility to select the right amount of service for any size organization
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- Global support from Symantec Security Response experts, which is available 24 hours a day, 7 days a week worldwide in a variety of languages for those customers enrolled in the Platinum Support Program
- Advanced features, such as the Symantec Alerting Service and Technical Account Manager role, offer enhanced response and proactive security support

Please visit our Web site for current information on Support Programs. The specific features available may vary based on the level of support purchased and the specific product that you are using.

Licensing and registration

If the product that you are implementing requires registration and/or a license key, the fastest and easiest way to register your service is to access the Symantec licensing and registration site at www.symantec.com/certificate. Alternatively, you may go to www.symantec.com/techsupp/ent/enterprise.html, select the product that you wish to register, and from the Product Home Page, select the Licensing and Registration link.

Contacting Technical Support

Customers with a current support agreement may contact the Technical Support group via phone or online at www.symantec.com/techsupp.

Customers with Platinum support agreements may contact Platinum Technical Support via the Platinum Web site at www-secure.symantec.com/platinum/.

When contacting the Technical Support group, please have the following:

- Product release level
- Hardware information
- Available memory, disk space, NIC information
- Operating system
- Version and patch level
- Network topology
- Router, gateway, and IP address information
- Problem description
  - Error messages/log files
  - Troubleshooting performed prior to contacting Symantec
  - Recent software configuration changes and/or network changes

Customer Service

To contact Enterprise Customer Service online, go to www.symantec.com, select the appropriate Global Site for your country, then choose Service and Support. Customer Service is available to assist with the following types of issues:

- Questions regarding product licensing or serialization
- Product registration updates such as address or name changes
- General product information (features, language availability, local dealers)
- Latest information on product updates and upgrades
- Information on upgrade insurance and maintenance contracts
- Information on Symantec Value License Program
- Advice on Symantec's technical support options
- Nontechnical presales questions
- Missing or defective CD-ROMs or manuals

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Chapter 1

Introducing Symantec LiveState Recovery

This chapter includes the following topics:

- About Symantec LiveState Recovery
- How the product works
- Where to find more information

About Symantec LiveState Recovery

Symantec LiveState Recovery is a complete server volume and workstation protection system for Windows Server 2003, Windows 2000 Server and Advanced Server, and Windows NT 4 Server. Using easy-to-follow wizards, you can perform fast and reliable system backups with zero downtime to the computer. Symantec LiveState Recovery is intelligent data protection technology that ensures the availability of business-critical information when disaster strikes.

The product consists of the Symantec LiveState Recovery agent and the Symantec LiveState Recovery management console. It also includes a utility called Backup Image Browser that simplifies the management of your backup image files.

Warning: The Symantec LiveState Recovery CD is used both to install the product and to boot a computer into the recovery environment, known as Symantec Recovery Disk. Be sure you store the CD in a safe place.

With Symantec LiveState Recovery you can:

- Use a secure and centralized administration point to protect data throughout a network domain from one or more consoles.
- Install the agent remotely on a server using the Deploy agent.
- Create *hot backup* image files (full or *incremental backup*) of volumes with zero downtime to the computer.
- Save backup images to a local hard disk, a network hard disk, or to disk media such as CD-R, CD-RW, DVD-R(W), DVD+R(W), or REV, Zip, and Jaz drives.
- Restore a computer to original condition from a *backup image* (full or incremental) or perform file-level restorations.
- Use Backup Image Browser to *mount a volume* within a backup image file and scan for viruses or set up as a share on the network domain.
- Perform *bare metal recovery*.

Also, if your organization uses Symantec LiveState™ Recovery Desktop, a network administrator can add workstations to the console to perform backup and restoration tasks on workstations throughout a network domain, all from a central location.

What is new in Symantec LiveState Recovery 3.0

Symantec LiveState Recovery contains the following new features and improvements:

- Event driven backups: When you create a base with incrementals backup job, you can select which events will trigger the automatic creation of incremental images. For example, at the time you log off of a computer or install an application, you can have the product create an incremental image.
  See "Event options" on page 65.
- Performance tuning: You can set the operation speed of the product during volume copying or during backup and restore tasks to improve the performance of other resource intensive applications that you run at the same time.
  See "Adjusting the operation speed during a task" on page 36.
- Encrypt backup images: Enhance the security of your data by using AES (Advanced Encryption Standard) to encrypt backup image files that you create or export.
  See "Encrypting a backup image" on page 58.

- Product tray icon: Get quick access to frequently used Symantec LiveState Recovery tools and information from the Windows system tray.
  See "Displaying the tray icon menu" on page 30.
- LiveUpdate: Using your Internet connection, you can use LiveUpdate to obtain program updates for Symantec software.
  See "Keeping current with LiveUpdate" on page 47.
- Consolidate incremental backup images: Reduce the number of backup files you have to maintain and makes more efficient use of hard disk space.
  See "To consolidate incremental images manually" on page 67.
- pcAnywhere thin host: If you have are using pcAnywhere Client, you can use the pcAnywhere thin host in Symantec Recovery Disk to restore a computer remotely.
  See "Using pcAnywhere Thin Host for a remote recovery" on page 123.
  Expanded event log and email: Send filtered notifications (errors, warnings, or information messages) to a log file, the system event log, or an email address.
  See "Setting notifications" on page 36.
- Driver validation: Check whether there are available drivers in Symantec Recovery Disk for network and storage devices on the computer. Running the Driver Validation helps to assure that the recovery functionality you might need later will work successfully on your computer.
  See "About Driver Validation" on page 43.

Unavailable features in limited version

If you have Symantec LiveState™ Recovery Standard Server or a limited (OEM or trial) version of Symantec LiveState Recovery Advanced Server, the following features may not be available:

- Ability to create a base image and incremental backups
- Consolidate incremental backup image files
- Event driven backups
- Copy a partition from one hard drive to another

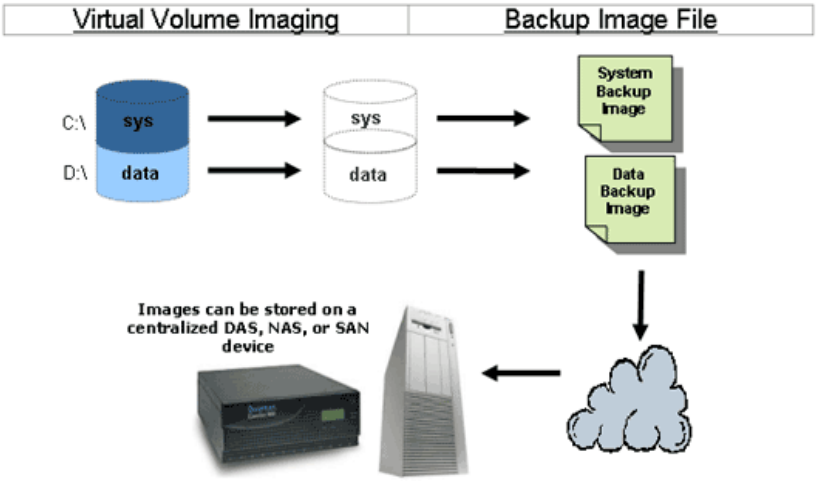
For more information about upgrading to a version that supports these features, please visit sea.symantec.com.

Note: Throughout the documentation, features that may not be available in limited versions of the product are indicated with a special Note.

How the product works

Using Symantec's Virtual Volume Imaging (v2i) technology, the product creates a point-in-time virtual representation (virtual volume image) of your server volume's state. A virtual volume image (.v2i) is not simply a file system copy of the contents of a hard disk. Instead, it is a low-level image of the complete hard disk structure (sectors and clusters) and its data, compressed and written to a single file.

This virtual representation is temporarily stored on the available free hard disk space that is present on the server volume. The product then generates an actual backup image file based on the details found in the virtual volume image.



This backup image file can then be saved to any Windows Server 2003, Windows 2000 Server and Advanced Server, and Windows NT 4 Server compatible storage device, such as a Direct Attached Storage (DAS), Network Attached Storage (NAS), or SAN (Storage Area Network) device.

Because the final backup image file is created based on the virtual volume image, the product performs backups quickly and does not interfere or interrupt the server's operations. IT Administrators can continue to perform server functions such as managing user rights, or running server applications and tools.

How the product handles user changes during backup

When a user begins a backup, Symantec LiveState Recovery starts the process of creating a virtual volume image while monitoring the file system for user changes. Any user changes that overlap with the V2i volume being backed up are still written to the hard disk in a normal fashion. This is because the product saves the old, overwritten data to a temporary space on the hard disk while insuring that any new data is still being saved. The old data is then written to the backup image.

The entire backup process is efficient because the product only writes sectors that contain data to the backup image.

Where to find more information

The product documentation provides glossary terms, online Help, a Readme file, and the Implementation Guide.

In addition to the product documentation, check the Symantec Web site and Knowledge Base for answers to frequently asked questions, troubleshooting help, online tutorials, and the latest product information.

See www.symantec.com/techsupp.

Looking up glossary terms

Technical terms used in this guide are defined in the Glossary.

Using online Help

Help is available throughout your Symantec product. Help buttons or links to more information provide information that is specific to the task that you are completing. The Help menu provides a comprehensive guide to all of the product features and tasks that you can complete.

To use online Help

1 On the Help menu, click **Contents**.

2 In the Help window, in the left pane, select a tab. Your options, as identified in Table 1-1, are

Table 1-1 Help options

Help option	Description
Content	Displays the Help by topic.

Table 1-1 Help options

Help option	Description
Index	Lists Help topics in alphabetical order by keyword.
Search	Opens a search field in which you can enter a word or phrase.

Viewing the Readme file

The Readme file contains information about installation and compatibility issues. It also contains technical tips and information about product changes that occurred after this guide went to press. It is installed on your hard drive in the same location as the product files.

To view the Readme file

1. In Windows Explorer, double-click **My Computer**.
2. Double-click the hard disk on which you installed the product.
3. In most cases, this will be drive C.
4. Click **Program Files** > **Symantec** > **Symantec LiveState Recovery** > **Shared** > **EN**.
5. Double-click **Readme.txt** to open the file in Notepad or your default word processing program.
6. Close the word processing program when you are done reading the file.

Chapter 2

Installing Symantec LiveState Recovery

This chapter includes the following topics:

- System requirements
- Installing the console and browser
- Adding groups of computers to the console
- Installing the agent
- Activating the product

System requirements

To install and use this product your computer must meet the minimum requirements described in Table 2-1.

Table 2-1 Minimum system requirements

Component	Requirements
Processor	Dependent on the operating system
Operating System	See Table 2-2, “Installation options,” on page 17.
RAM	■ Agent – 256 MB ■ Management Console and Backup Image Browser – 256 MB ■ *Symantec Recovery Disk* – 256 MB minimum. Symantec Recovery Disk (the recovery environment), is not installed; instead, it runs directly from the product CD

Table 2-1 Minimum system requirements

Component	Requirements
Hard Disk Free Space	■ Agent – 60 MB ■ Console – 135 MB ■ Backup Image Browser – 45 MB ■ Microsoft .NET Framework 1.1 – 110 MB of hard disk space required, 40 MB additional hard disk space required for installation program (150 MB total), if not already installed. ■ Storage space on the network for your backup images
CD-ROM or DVD-ROM drive	Any speed and bootable in BIOS To see if the product supports your CD or DVD writer, please visit www.gearsoftware.com/support/tables/tables.cfm. Specify your OS and the manufacturer of your CD or DVD writer to see if your device is supported. See "I cannot boot the computer from the CD" on page 121.
Software	The first time you start the product, you are prompted to install the Microsoft .NET Framework 1.1, if it has not already been installed. The .NET Framework is a required component to run the product.

Supported file systems and removable media

This product supports the following file systems and removable media:

Supported file systems	FAT16, FAT16X, FAT32, FAT32X, NTFS, *dynamic disks*, Linux Ext2, Linux Ext3, and Linux swap partitions
Removable media	You can save backup image files locally (that is, backup image files are created and saved on the same computer where the console is installed) or to most CD-R, CD-RW, DVD-R(W), and DVD+RW recorders on the market today. For an updated list of supported drivers, please see the Symantec web site. The product also supports saving backup image files to most USB devices, 1394 FireWire devices, REV, Jaz, or Zip drives, and magneto-optical devices. **Note:** This product does not support RAM drives or backing up directly to tape.

Installation options

If you need a data protection solution for enterprise workstations, use the latest version of Symantec LiveState™ Recovery Desktop. If you need a data protection solution for home computers, use the latest version of Norton Ghost™.

Table 2-2 describes the options that you can select (or deselect) at the time of installation on a particular Windows operating system.

See "Which options should I install?" on page 18.

Table 2-2 Installation options

Windows operating system	Management console	Backup Image Browser	Agent
Server 2003	X	X	X
2000 Advanced Server (SP2 or greater)	X	X	X
2000 Server (SP2 or greater)	X	X	X
NT 4 Server (SP6a)			X
XP Professional (SP1 or greater)	X	X	
2000 Professional (SP2 or greater)	X	X	

Which options should I install?

If you are installing the product on a computer that is running Windows Server 2003, Windows 2000 Server and Advanced Server, Windows NT 4 Server, Windows 2000 Professional, or XP Professional you will be able to select three options:

- Management Console
  See "Management console" on page 18.
- Agent (for servers only)
  See "Agent" on page 18.
- Backup Image Browser
  See "Backup Image Browser" on page 19.

Management console

Install the management console on a computer that you will use to manage the creation and restoration of backup image files on local and remote computers. The console guides you through the creation and restoration of backup images on servers that are in the same domain and that have the agent installed. You should also install Backup Image Browser on the same computer where the console is installed.

Install the console on computers that are easily accessible by authorized personnel.

Agent

The agent functions as a service and, therefore, does not have a full graphical user interface. It does, however, have a tray icon available in the Windows system tray area. The tray icon can be used, among other things, to view the current status of the agent. The agent is the unseen "engine" that does the actual creating and restoring of backup images on a computer, via the console.

You can install the agent manually by visiting each server you want to protect and installing the agent from the product CD. A more efficient method, however, is to use the Deploy Agent feature found in the console to remotely install the agent on a server in the domain whose data you want to protect.

Warning: To access the agent and any shared network servers, you must be a domain user with local administration rights. If you do not have sufficient privileges to the server, you can still install the agent but you will not be able to connect to it from the console.

Backup Image Browser

You can use Backup Image Browser to simplify the management and maintenance of your backup image files. Working within a single screen, Backup Image Browser gives you control of the backup image files you can access. For example, you can view backup image file contents, restore individual program and data files from within a backup image, or you can *mount a volume* within a backup image and share its contents on the network.

You should install Backup Image Browser on computers that are easily accessible by authorized personnel.

Upgrading the product

If you have a previous version of the product installed on a computer, you will need to uninstall these versions (including the server agent) before you install Symantec LiveState Recovery.

30-day evaluation

If you are installing the 30-day evaluation of the product you can install all the applications and create backup images of system and data volumes. You can also perform restorations of data volumes and files/folders. However, the system volume restoration function and the Copy Drive feature are not available with the downloaded evaluation because Symantec Recovery Disk is not included.

You also have open access to Symantec's online technical support library. You can view up-to-date support information, including a searchable knowledge base, software library files, frequently asked questions, customer-to-customer newsgroups, and additional technical information at the Symantec Support Knowledge Base.

Symantec LiveState Recovery Evaluation expires 30 days after your first use of the software. However, you can upgrade to the full version at any time (even after the trial expiration) without reinstalling the software.

See "Activating the product" on page 26.

See sea.symantec.com.

Licensing

Symantec LiveState Recovery licensing is based on the number of protected servers. That is, if your organization is protecting 100 servers, the price you pay for the product is based on 100 servers, without regard for how many servers are running the management tools (Console and Backup Image Browser) and where the backup images are saved.

Flexibility in installation

With Symantec LiveState Recovery, you can install any features you want on the appropriate servers and computers, thereby giving you the most flexibility in protecting your data. Based on your own needs, for example, you may choose to install the console and browser on a *remote computer* so you can manage other servers that are in that physical location. Or, you may decide to install the console, agent, and browser on the same server, so you can manage all aspects of data protection on that single computer.

Installing the console and browser

This section is intended for system administrators and those responsible for creating and maintaining backups on a local file server on a network. It describes how to install the Symantec LiveState Recovery console and Backup Image Browser. The computer you install these management tools on will serve as the central management point for the creation of backup images on the servers that have the agent installed.

The console and browser let you drive the creation and restoration of *backup image* files of network volumes on servers that have the agent installed.

Before you begin, ensure that you have carefully reviewed the requirements for installing Symantec LiveState Recovery.

See "System requirements" on page 15.

To install the Symantec LiveState Recovery console and browser

1. Before installing the console and browser, you must first uninstall any previous versions of the product.
2. Insert the product CD into the media drive of the computer.
   If CD auto-run is enabled, the installation program launches automatically.
3. If the CD auto-run is not enabled, click **Start** > **Run**, then type **drive:\autorun** (where drive is the drive letter of your media drive), then click **OK**.

4 Select the language you want, then click the arrow.

5 From the CD browser screen, click **Install LiveState Recovery**.

6 In the Welcome screen, click **Next**.
If the installation program detects a previous version of the product, you must first uninstall the previous version before continuing.

7 Read the license agreement, then click **I accept the terms in the license agreement**.

8 Click **Next**.

9 If you want to change the default location for the Symantec LiveState Recovery program files, click **Change**, locate the folder where you want to install Symantec LiveState Recovery, then click **OK**.

10 Click **Next**.

11 Do one of the following:

- If you are installing on Windows 2000 Server, 2000 Advanced Server, or 2003 Server, select **Management Console**, **Backup Image Browser** and, optionally, **Agent**, then click **Next**.
- If you are installing on Windows XP Professional or Windows 2000 Professional, click **Next**.

12 Click **Next**.

13 Click **Install**.
A progress screen shows the status of the installation.

14 In the Driver Validation screen, read the information about the driver validation, then click **Validate Devices**.
See "About Driver Validation" on page 43..

15 Click **Finish** to complete the installation.

16 Click **Yes** to exit the install wizard and reboot the computer.
You must restart your computer before running Symantec LiveState Recovery. When the computer reboots, you are returned to the Windows desktop.

17 Remove the Symantec LiveState Recovery CD from the media drive.

Warning: The Symantec LiveState Recovery product CD is used both to install the product and to boot a computer into the recovery environment, known as Symantec Recovery Disk. Be sure you store the CD in a safe place.

After installing, we recommend that you test Symantec Recovery Disk by booting the computer using the product CD, especially if the Driver Validation indicated there were any unavailable drivers for devices when using Symantec Recovery Disk.

See "Testing Symantec Recovery Disk" on page 44.

Starting Symantec LiveState Recovery

To start Symantec LiveState Recovery

- From the Windows Start menu, click **Programs** > **Symantec LiveState Recovery** > **LiveState Recovery Advanced Server** (or **LiveState Recovery Standard Server**).

Installing Microsoft .NET Framework

The first time you run Symantec LiveState Recovery, if Microsoft .NET Framework is not installed, you are prompted to install it.

The .NET Framework is a required component to run the product.

To install Microsoft .NET Framework

1. Start the product.
2. When prompted to install Microsoft .NET Framework 1.1, click **Yes**.
3. In the Microsoft .NET Framework Setup window, read the license agreement.
4. Click **I agree** to accept the license agreement.
5. Click **Install**.
6. Click **OK** when the installation is complete.
   After installing .Net Framework, you should be able to start the product.

Installing the Symantec license file

The first time you run Symantec LiveState Recovery, the Install License screen appears. You can install a license file to activate the full version or use the trial version.

See "30-day evaluation" on page 19..

See "Activating the product" on page 26..

Post-installation tasks

After you install the console and the browser, you will create one or more groups in the console tree pane, then add computers to each group. For example, you could group all computers in a finance department under the group “Finance”.

See “Adding groups of computers to the console” on page 23.

For each computer you add to a group that does not have the agent already installed, you will use the Deploy Agent feature in the console to push out an install of the agent onto each computer whose data you want to back up.

See “Installing the agent” on page 25.

Note: If you installed the console, Backup Image Browser, and the agent on a single server, you can begin to back up all your critical data on that computer.

Adding groups of computers to the console

Have you installed the console on a computer?

See “Installing the console and browser” on page 20.

Before you can back up drives on a computer, you must create groups of computers in the tree pane of the console, then push out an install of the agent onto each computer, one at a time, using the Deploy Agent feature.

See “Installing the agent” on page 25.

Add groups of computers to the console

You can add groups of computers to the console, add a local computer, add a remote computer, or remove a computer from a group.

To add a group of computers

1. Open the Symantec LiveState Recovery console.
   If you installed the console, Backup Image Browser and agent on the same computer, the local computer is automatically added to the tree pane of the console.
2. In the tree pane of the advanced view, right-click and then click **Add Group**.
3. Type a name for the new group, then click **OK**.
4. In the tree pane, right-click and then click **Add Computer**.
5. Add the computers you want to manage.
   See “To add a local computer” on page 24.

See "To add a remote computer" on page 24.

6 If you want to change the name of an existing group, right-click on the group name, then click **Rename Group**.

7 If you want to delete a group, right-click on the group name, then click **Remove**.

To add a local computer

1 In the Select Computer dialog box, click **Local computer** to add the server that the console and agent are running on.

2 Select the group you want the computer added to from the **Add to group** drop-down list.

3 Click **OK**.

Note: Clicking Local computer > OK when only the console is installed on the computer will result in an error.

To add a remote computer

1 In the Select Computer dialog box, click **Another computer** to add a remote server to the group.

2 Click **Browse**.

3 In the text box, type the name of the domain that you want to search.
For example, **business.co**.

4 In the **Containing text** field, type any text you want to search for in the computer name.

5 Click **Search**.
The search returns a list of computers available including a list of those computers that are already configured with the agent.
The computer search is done in the security context of the current logged-in user's domain.
See "Running the console using different user rights" on page 147.

6 Select a computer from the **Results** list box, then click **OK**.
If you add a computer with a computer name longer than 14 characters, you must truncate the name to be 14 characters or less.

7 Select the group you want the computer added to from the **Add to group** drop-down list.

8 Click **OK**.

To remove a computer from a group

- In the tree pane of the advanced view, right-click on the computer that you want to delete, then click **Remove**.
  This removes the computer from the console only; it does not uninstall the agent from the server.

Installing the agent

You can use the Deploy Agent feature in the console to push an installation of the Symantec LiveState Recovery agent to a selected server you want to protect in the domain. Once the agent is installed on servers, you can begin protecting them remotely by creating *backup image* files of data or operating system volumes.

Before using the Deploy Agent feature to install the agent, do the following:

- Obtain the names of the machines where you want to deploy the agent.
  The Deploy Agent feature is intended for use in a domain environment. This feature cannot be used in a workgroup environment for mass deployment. To use the Deploy Agent Wizard for deploying the agent to one computer in a workgroup environment, you must enter the computer name in the Domain field on the Deploy Options window.
- Have sufficient user rights.
  When using Deploy Agent, the product uses the credentials for the user who is currently logged onto the console.
- Create groups of servers in the console.
  See "Adding groups of computers to the console" on page 23.
- Carefully review the requirements for installing Symantec LiveState Recovery agent.
  See "System requirements" on page 15.
- Note which servers have less than 256 MB of memory.
  You can still install the agent. However, if you later need to restore a server using the *Symantec Recovery Disk*, the computer will need at least 256 MB of available memory to run the System Restore Wizard or Backup Image Browser from the recovery environment.
- Close any open applications before continuing with the agent installation; to complete the installation you should restart the computer when prompted.

To install the Symantec LiveState Recovery agent

1. In the tree pane of the advanced view, select a group that contains a server that does not yet have the agent installed on it.
   You must have administrator rights for the server where you are installing the agent.
2. In the tree pane of the advanced view, select a server.
3. Click **Tools** > **Deploy Agent**.
4. In the Deploy Agent dialog box, specify the domain name, user name, and password to access the server as a different user with Administrator privileges.
5. If you want to reboot the server when the agent installation is finished, click **Reboot when finished**.
6. Click **OK**.

The agent is deployed to the selected computer.

Post-installation options

Now that you have installed the agent on the servers you want to protect, you have the following options:

- You can begin to back up all your critical data on each server that has the agent installed on it.
- Take a brief tour of the Symantec LiveState Recovery management tools and agent.
  See "Using the console" on page 29.
  See "Using the agent" on page 40.
- Give other users the ability to back up servers.
  See "Controlling access to the agent (or console)" on page 146.
- Test the recovery environment.
  See "Testing Symantec Recovery Disk" on page 44.

Activating the product

Product activation is a technology that protects users from pirated or counterfeit software by limiting use of a product to those users who have acquired the product legitimately. Product activation requires a unique serial number and a license file for each installation of a product. You must activate the product within 30 days of installing it. Product activation is completely separate from registration.

When to activate your product

When you first start the software, you are asked to enter the path to the license file to activate the product. If you choose not to activate, each time you start the software an alert appears to remind you to activate the product.

To use the full version of Symantec LiveState Recovery, you must activate the product by obtaining a license file using the serial number for your purchased product.

If you do not activate the product within 30 days of installing it, the product will stop working. You can activate it after the 30 days have elapsed.

See "30-day evaluation" on page 19.

See "Unavailable features in limited version" on page 11.

To activate Symantec LiveState Recovery

1. From the Symantec LiveState Recovery console, click **Help** > **Unlock Trial Product**.
   In the Install License screen, you can purchase the product, use the serial number to get a license file, and install a product license file.
2. If you do not have a license file, use the product serial number to obtain the license file.
   - If you do not have a serial number for Symantec LiveState Recovery (because you have not purchased the software), click **Buy Now** to pay for the software and receive a serial number.
   - If you have a serial number for Symantec LiveState Recovery, click **Get License** to obtain a license file.
3. If you have a license file, click **Browse** to locate and open the license file.
4. Click **Install**.

The licenser distinguishes your computer from others without storing information about you or your computer's hardware and software. Unlocking your software may trigger an optional registration. Registration data is generally used for demographic purposes and is not resold. You can opt out of marketing-oriented uses of your data as part of registration.

Chapter 3

Getting started

This chapter includes the following topics:

- Using the console
- Working with basic features
- Using Backup Image Browser
- Using the agent
- Best practices for back up protection
- Tips on using Symantec LiveState Recovery
- About Driver Validation
- Testing Symantec Recovery Disk
- Booting a computer into the recovery environment
- Keeping current with LiveUpdate

Using the console

If you are new to Symantec LiveState Recovery, you may find it helpful to first review this information before creating or restoring any backups.

The console lets you create, schedule, and restore backup image files from your workstation, manage existing backup files, and manage and view the complete status of the agent itself. You can also restore backup images or perform a complete bare metal restore of a computer, all from an easy-to-use interface.

Using the console, you can connect to the agents on any number of computers on your network that have the agent already installed.

Starting the console

You can start the console from the Windows taskbar or from the Windows system tray.

To start the console

- Do one of the following:
  - On the classic Windows taskbar, click **Start** > **Programs** > **Symantec LiveState Recovery** > **LiveState Recovery Advanced Server** (or **LiveState Recovery Standard Server**).
  - On the Windows XP taskbar, click **Start** > **All Programs** > **Symantec LiveState Recovery** > **LiveState Recovery Advanced Server** (or **LiveState Recovery Standard Server**).

To use the full version of Symantec LiveState Recovery, you must activate the product.

See "When to activate your product" on page 27.

Starting the console from the system tray

Symantec LiveState Recovery adds an icon to the Windows system tray. By default, the tray icon appears in the lower-right corner of your computer monitor on the Windows taskbar.

To start the console from the system tray

- Do one of the following:
  - In the Windows system tray, double-click the Symantec LiveState Recovery tray icon.
  - In the Windows system tray, right-click the Symantec LiveState Recovery tray icon, then click **Run Symantec LiveState Recovery**.

Displaying the tray icon menu

From the tray icon, you can quickly access the following Symantec LiveState Recovery tools and information:

- Schedule backups or incremental backups using the Backup Job Wizard.
- Create an immediate backup image of a selected drive using the Drive Backup Wizard or a previously defined backup job.
- Restore a selected drive using the Restore Drive Wizard.
- View currently scheduled backup jobs.

- Start Symantec LiveState Recovery.
- Restore selected files or folders using Backup Image Browser.
- Adjust the speed of the product during the creation of backup images or during a restoration.
- Cancel the current backup operation.
- Display the product version number.

To display the tray icon menu

- In the Windows system tray, right-click the product's tray icon to display a quick menu of frequently used tools.

Checking the version number

You can check the version number of your product on your computer. Use the version number to help you find more information about your product on the Symantec Web site.

To check the version number

- Do one of the following:
  - On the Help menu, click **About Symantec LiveState Recovery**.
  - On the Windows system tray, right-click the product tray icon, then click **About Symantec LiveState Recovery**.

Console parts

The console is composed of the tree pane, the main window, and the task pane.

Tree pane

The tree pane, on the left side of the console, shows a hierarchical structure of computers that are connected to the console. From this left pane, you can create groups and add computers to them.

Main window

The main window of the console includes four tabs: Drives, Backup Jobs, Backup History, and Events.

Depending on the tab you have selected, you can:

- Manually create a full backup
- Schedule a backup job to create a base image with incrementals

- Restore backup images or files and folders from within a backup image file
- View the backup history of a selected drive
- View events to verify that the product is functioning properly

Task pane

The task pane, on the right side of the console, shows a list of common tasks you can perform. The list of tasks will vary depending on the tab you have selected in the main window.

From the task pane you can:

- Push out an install of the agent using the Deploy Agent feature
- Create or restore backup images
- Copy one hard drive to another hard drive of the same size or larger
- Alternate between the basic and advanced views
- Rescan hard disks to update information displayed in the interface
- Learn more about a particular task

Working with basic features

There are some basic features that will help you use the product:

- Basic and advanced views: Lets you view all product functionality (advanced view) or only the most commonly used features (basic view).
- Backup Image Browser: Lets you restore files and folders, and manage and maintain backup image files.

Selecting basic and advanced views

With Symantec LiveState Recovery, you can alternate between the basic view and the advanced view of the console.

- Use the advanced view to schedule backup jobs, create *incremental backup* images, or review the backup history of a server.
  You can also use the Deploy Agent in the Symantec LiveState Recovery to push out an install of the agent onto servers that are listed in the tree pane of the console.
  See "Installing the agent" on page 25.

- Use the basic view to perform simple tasks quickly such as creating or restoring a backup image, copying the contents of a hard drive directly to another drive, or restoring files or folders within a backup image.

See "Unavailable features in limited version" on page 11.

To select the basic or advanced view

1. From the console window, select any server in the tree pane.
2. On the View menu, click **Basic View** or **Advanced View**.

Rescanning a computer's hard disk

Use Rescan Disks to update the display of information in the main window of the console, for a selected computer. This feature is useful when the hard disk configuration has changed (such as adding hard disk space, copying a hard drive, or creating a partition) but the changes do not immediately appear in the console.

When you rescan disks, it scans all attached hard disks for any changes to its configuration. It also updates information on removable media, CD-ROM or DVD-ROM drives, basic volumes, file systems, and hard drive letters.

To rescan a computer's hard disk

1. In the tree pane of the advanced view, select a server whose disk you want to scan.
2. In the main window of the advanced view, click the **Drives** tab.
3. Select a drive you want to scan.
4. On the Tools menu, click **Rescan Disks**.
   The Status area in the task pane indicates whether scanning is taking place, whether a backup image is currently underway, or whether the console is ready to accept a backup job or restoration.

Stopping the current task

You can stop a backup task or a restore task that has already started.

To stop the current task

- Do one of the following:
  - On the Tools menu, click **Cancel the Current Operation**.
  - On the Tools menu, click **Progress and Performance**, then click **Cancel Operation**.

- On the Windows system tray, right-click the product's tray icon, then click **Cancel the Current Operation**.

Viewing events in the product

You can use the Events viewer to display information, errors, or warnings that occur within the product.

To view events in the product

- In the advanced view of the product, click the **Events** tab.

You can also use the Windows Event Viewer to monitor or remove events from the application logs.

Viewing the backup history of a drive

You can view the backup image history of a drive and general status information, such as the backup and compression type, and where the image is stored.

You can also view a chronological history of all the backup images taken of selected drives (even if the backup image has been deleted from the storage location), including the original location of each backup image file.

The picture icon next to each drive letter gives you a quick visual indication as to the type of backup that is being created (full, baseline, or incremental).

Note: A drive with a red "X" next to it indicates that the drive is not available for backing up, usually because the drive has been deleted or the entire hard disk has been removed since you installed the product. The drive remains visible so you can view its backup history. If you prefer, you can right-click on the unavailable drive, then click Delete to remove it from the list. However, you will lose all history and any backup jobs associated with that drive.

See "Viewing events in the product" on page 34.

See "To consolidate incremental images manually" on page 67.

View the backup history of a drive

You can view the backup history of a drive from the advanced view of the product's console or from Windows Explorer.

To view the backup details of a drive from the console

1. In the tree pane of the product console, select a server that contains the volumes whose properties you want to review, then click the **Backup History** tab.
2. In the list box, select a backup to view specific backup details about it.

To view the backup details of a drive from Windows Explorer

1. In Windows Explorer, right-click on a drive letter.
2. Click **Properties**.
3. In the Properties dialog box, click the **LiveState Recovery** tab to view the Backup History list box.

Cleaning the backup history

Use Clean Backup History to delete the log file entries and backup images for product events prior to the last full backup you made (or the last base image you made with incrementals). For example, if you back up a computer every Sunday morning, and clean the backup history on Sunday afternoon, the history prior to last Sunday's backup would be erased.

Warning: When you use Clean Backup History, be aware that all backup history entries and associated backup image files prior to the last backup are deleted.

To clean the backup history

1. In the tree pane of the product console, select a server that contains the volumes whose backup history you want to delete, then click the **Backup History** tab.
2. On the Tools menu, click **Clean Backup History**.

Setting a default backup location

You can specify the default path where backup image files are stored. This default path is used if you do not specify a different path when you create a backup.

To set a default backup location

1. On the Tools menu, click **Options**.
2. Click the **Default Settings** tab.
3. Select the default location for backup files in the drop-down list.

4 Depending on the default location you selected, specify the folder or CD/DVD drive where the backup image will reside.
See "Selecting a storage location for backup images" on page 53.

Setting the default operation speed

You can set the default operation speed of the product during volume copying or during backup and restore tasks. Setting the operation speed may improve the performance of other resource intensive applications that you run at the same time.

Note: Setting the operation speed in the product does not control network bandwidth, or control the resources of a hard disk or CPU.

To set the default operation speed

1 On the Tools menu, click **Options**.

2 Click the **Default Settings** tab.

3 Move the slider left to decrease or right to increase the operation speed of the product.

Adjusting the operation speed during a task

By overriding the default setting in Options, you can adjust the operation speed of the product at any time during a task such as the creation of backup images or during a restore, or when you are copying a volume. The next time you start another task, the default operation speed will be used.

To adjust the operation speed during a task

1 In the Windows system tray, right-click the product's tray icon.

2 Click **Progress and Performance**.

3 Move the slider left to decrease or right to increase the operation speed of the product.

Setting notifications

You can direct notifications (errors, warnings, or information messages) to a log file, the system event log, or an email address.

By default, all notifications are automatically sent to the system event log and to a custom log file (located in the Agent folder of the product installation).

You can specify notification settings for each computer where the agent is installed.

To set notifications

1. In the tree pane of the product console, select a computer that contains the drives whose backup imaging properties you want to set, then click **Tools** > **Options**.
2. In the **Notifications** tab, select the type of notification you want.
   - LogFile
   - EventLog
   - E-mail
3. Click **Properties**.
4. Specify the minimum priority level you want filtered, then specify the types of notifications you want reported.
5. If specifying default log file settings, specify the location and the maximum file size of the log file.
   When the maximum file size is reached, the log file is renamed (*.old) and a log file of the original name is created to which logging continues.
6. If specifying default email settings, specify the to and from addresses, and the SMTP server to use in sending notifications.
   - In the To address text box, type the email address (for example: **admin@domain.com**) where notification will be sent regarding any important failures or events.
   - In the From address text box, type the email address of the sender.
   - In the SMTP Server text box, type the name of the SMTP server to use in sending e-mail notifications (for example: **smtpserver.domain.com**).
7. Click **OK**, then click **OK**.
   The notification settings are checked to verify whether notifications can be logged or sent.
   If email notification are not being delivered, check the setup of your SMTP server to ensure it is functioning properly.

Note: To review any information, errors, or warnings within the software, click the Events tab in the advanced view of the console or use the Windows Event viewer to monitor application events.

Using Backup Image Browser

Backup Image Browser, included with the product, simplifies the management and maintenance of your *backup image* files. Working within a single screen, Backup Image Browser gives you control of the backup image files you can access.

For example, you can view backup image file contents, restore individual program and data files from the backup image, or you can mount a selected drive and share it across a network.

Backup Image Browser also displays backup image descriptions, so you can identify individual backup image files. You cannot modify folders and files from within a backup image and save them again as part of the image.

Starting Backup Image Browser

You can start Backup Image Browser from the Windows Start menu.

To start Backup Image Browser

- Do one of the following:
  - On the classic Windows Start menu, click **Programs** > **Symantec LiveState Recovery** > **Backup Image Browser**.
  - On the Windows XP Start menu, click **All Programs** > **Symantec LiveState Recovery** > **Backup Image Browser**.

  By default, the Open dialog is displayed each time you start Backup Image Browser. You can select a *backup image* file to open, or you can click **Cancel**, then select a previously opened backup image file from the File menu.

All the features of Backup Image Browser are accessed from the main program screen or by right-clicking anywhere in the tree pane or content pane.

Using the tree pane

The tree pane shows a hierarchical tree view of all the backup image files (*.v2i*, *.iv2i*, .pqi) that you have opened in Backup Image Browser.

From the tree pane you can:

- Mount or dismount a V2i drive inside a backup image or from Windows Explorer
  See "To mount a drive within a backup using Windows Explorer" on page 82.
- Export a backup image file to span across media
- Verify that the selected backup image file or set of files is valid

- Browse folders inside a backup image
- View the properties of a selected backup image file
- Open or close backup image files

Using the content pane

The content pane shows the contents of the selected mounted drive, folder, backup image file, or V2i drive.

Depending on if you have selected a backup image file (.v2i, .iv2i, .pqi), volume, folder, or file you can do the following directly from the content pane:

- Restore selected files and folders from within a backup image file
- Mount or dismount a v2i drive inside a backup image file
- View the contents of a selected file
- View the properties of a selected volume

Opening or closing a backup image

By default, the Open dialog box is displayed each time you start Backup Image Browser.

Open or close a backup image

You can open backup image files either from Backup Image Browser or from Windows Explorer.

To open a backup image in Backup Image Browser

- Do one of the following:
  - In the Open dialog box, select a backup image file to open.
  - On the File menu, select a previously opened backup image file.
    Note that the File menu maintains a list of the most recently opened backup image files.

To open a backup image in Backup Image Browser from Windows Explorer

- Do one of the following:
  - In Windows Explorer, double-click a backup image file.
  - In Windows Explorer, right-click on a drive letter that has been backed up, then click **Properties**. Click the **LiveState Recovery** tab. In the Backup History list box, select a backup image, then click **Restore Files**.

To close a backup image in Backup Image Browser

1. In the tree pane of Backup Image Browser, select the backup image name.
2. On the File menu, click **Close**.

Using the agent

The agent is the unseen "engine" that does the actual creating and restoring of backup images on a computer using information provided by the console. Because the agent functions as a service, it does not have a graphical interface.

See "Managing the agent using Windows Services" on page 141.

The agent does, however, have a tray icon available from the Windows system tray to provide feedback of current conditions and to perform common tasks. For example, you can view backup jobs created for the server, reconnect the agent, or cancel a task that is currently running.

See "Starting the console from the system tray" on page 30.

See "Displaying the tray icon menu" on page 30.

To use the agent

- On the Windows system tray, do one of the following:
  - Hover over the product's tray icon to view the current condition of the agent. If the service indicates that it is not running, you will be unable to create backups.
    See "Viewing events in the product" on page 34.
  - Double-click the product's tray icon to open the console. (If the console is not installed, double-clicking the product's tray icon opens the About Symantec LiveState Recovery dialog box.)
  - Right-click the product's tray icon to display a quick menu of common agent tasks.

See "Controlling access to the agent (or console)" on page 146.

Best practices for back up protection

The following list represents some best practices for creating full backups. You should implement this list whenever possible.

Before a back up

The following strategies can help ensure successful full backups, especially on servers.

- Simplify recovery and reduce the time it takes to create backup images.
  Separate the boot/operating system from the business data. Put the boot/operating system and the data on their own respective drives. This separation speeds the creation of *backup image* files and narrows what needs to be restored.
- Synchronize computer times.
  If you intend to use the Create Backup Job Wizard to create scheduled backups, make sure the times on the computer running the console and the computer you are scheduling to back up are as close as possible.
  When you are using the console to back up computers that exist across one or more time zones, if the “console time” and the “agent time” are not as close as possible, a backup job could be missed. Refer to Microsoft online Help for information on how to change the time and date on a computer. If the computers times are not synchronized in a domain, contact your system administrator to resolve the issue.
- Run Windows Disk Defragmenter and chkdsk utilities before *full* back ups.

During a back up

Symantec LiveState Recovery greatly simplifies the creation of backups. To take advantage of this, consider the following strategies.

- Create backup images often and regularly.
  Use the Create Backup Job Wizard to schedule the consistent creation of backup images.
- Save hard disk configuration data.
  Save the disk configuration data whenever you use the Windows Disk Management feature.
- Save backup images to the proper location.
  This product supports saving backup image files to a network hard disk or to a local hard disk (including USB, FireWire, REV, Zip, and Jaz drives, and magneto-optical). It does not support saving backup image files directly to a

tape drive. To save backups to tape, save the backup to another drive, then use your existing tape backup strategy to save the backup image file to tape.

After a back up

The following strategies can help you successfully manage backups once they are created.

- Maintain duplicate backup images for safety.
  Store backup images elsewhere on the network and create CDs, DVDs, or tapes of the backup images for storage off-site in a safe and secure place.
- Verify that backup image file or set of files is stable and usable.
  Document and test your entire restore process by doing regular restores of backup image files (using the console), and single files (using Backup Image Browser). Doing so can uncover potential hardware or software problems.
  Use Verify backup image at the time you create a backup image file or use Verify Image from Backup Image Browser to periodically check the integrity of all your backup image files.
- Consolidate incremental backup images.
  Combine incremental backups to reduce the number of files you have to maintain. This strategy also uses hard disk space more efficiently.
- Review the Events tab.
  Periodically review the contents found in the Events tab of the console to ensure stability in the computer system.
- Review the contents of backup image files.
  Ensure that you are backing up essential data by periodically reviewing the contents of backup image files.

Tips on using Symantec LiveState Recovery

- You can select a backup file (.v2i, .iv2i, .pqi) in Backup Image Browser, then mount the drive and set it up as a share that can be accessed remotely from another computer.
  See "Mounting a drive within a backup" on page 81.
  You can then restore selected files and folders to the *remote computer*.
  See "Restoring files from a backup image" on page 80.
- If desired, you can create the backup image file directly to your choice of removable media (such as a USB or Firewire drive, Zip, JAZ, or magneto-optical) or to CD or DVD for long-term storage or for storage off-site.

- If the computer you are backing up has power management features (such as going into hibernation after a period of inactivity), they may conflict with the product during the creation of a backup image.
  If you experience any of these problems, you may need to reboot the computer, turn off all power management features, then create the backup image again.
  Check inside the Microsoft Services console (services.msc) to ensure that the agent is running (started). If it is running, you will be able to use the console to create backup images of the computer.
  See "Managing the agent using Windows Services" on page 141.

About Driver Validation

Driver Validation checks whether there are available drivers in Symantec Recovery Disk for network and storage devices on the computer. Running the Driver Validation helps to assure that the recovery functionality you might need later will work with your computer's device configuration.

When you install Symantec LiveState Recovery, the installation program automatically runs the Driver Validation tool to check devices against drivers available in the recovery environment (Symantec Recovery Disk) and displays the validation results.

Getting Driver Validation results

When drivers for all devices in use by the computer are available in the recovery environment, the Driver Validation tool displays a message indicating that the storage devices and network cards detected have drivers in Symantec Recovery Disk.

When storage and network devices *cannot* be used when booting with Symantec Recovery Disk because the drivers are not included, a Driver Validation Results dialog appears. While you can use the product, you should obtain the necessary drivers and test Symantec Recovery Disk *before* you must rely on the functionality provided by the recovery environment.

If a screen appears listing devices, know that

- Drivers for listed devices are not available in the recovery environment
- Without the drivers, the devices cannot be used in the recovery environment
  - If a network card driver is not detected, contact technical support.
  - If a storage controller driver is not detected, if you have the necessary drivers, you can add additional drivers when booting with Symantec

Recovery Disk by pressing <F6> at the “Press any key to boot from CD” prompt.
See “I cannot access (or see) the local drive where my backups are saved” on page 121.

Note: We recommend putting all additional storage controller drivers on a CD or floppy disk for quick access for later use.

- Before relying on Symantec Recovery Disk to recover an image (or use other functionality), you should obtain the necessary drivers and test booting with Symantec Recovery Disk to verify that drivers for the specified devices can be used *before* you must depend on the functionality in the recovery environment.
See “Testing Symantec Recovery Disk” on page 44.
- Saving the validation results can be useful when adding additional drivers or when contacting support concerning missing network card drivers.

Testing Symantec Recovery Disk

You should test Symantec Recovery Disk (the recovery environment) to ensure it runs properly on your system.

Warning: The Symantec LiveState Recovery CD is used both to install the product *and* to boot a computer into the recovery environment, known as Symantec Recovery Disk. Be sure you store the CD in a safe place.

If Symantec Recovery Disk does not run as expected, you can take action early to fix the problems. Then if your backed up computer experiences a catastrophic failure later, you will be assured that you can run Symantec Recovery Disk to recover the system or your data.

To test Symantec Recovery Disk

1. Run Driver Validation to ensure Symantec Recovery Disk will work with the network and storage devices on the computer.
See “About Driver Validation” on page 43.
2. Boot into Symantec Recovery Disk using the product CD.
See “Booting a computer into the recovery environment” on page 45.
3. When you have booted into Symantec Recovery Disk, do one of the following:

- If you intend to store backup images on a network, run a mock restore of a backup image that is stored on a network to test network connectivity.
- If you intend to store backup images on the computer, run a mock restore of a backup image that is stored locally to test local hard drive connectivity.
  See "Restoring a single drive using the recovery environment" on page 96.

If you experience problems while testing the recovery environment, you may find a solution below.

- You are having problems booting into Symantec Recovery Disk from the product CD.
  See "I cannot boot the computer from the CD" on page 121.
- You do not have the necessary NIC drivers to access backup images on a network.
  See "I cannot access the network drive where my backups are saved" on page 122.
- You do not have the necessary storage drivers to access backup images on the computer.
  See "I cannot access (or see) the local drive where my backups are saved" on page 121.
- You need information about your system to help you run the recovery environment.
  See "I do not know the system information that I am required to enter" on page 110.

See "Recovery environment" on page 117.

Booting a computer into the recovery environment

The Symantec LiveState Recovery product CD is used both to install the product *and* to boot a computer into the recovery environment, known as Symantec Recovery Disk. Be sure to store the CD in a safe place.

See "How does Symantec Recovery Disk work?" on page 118.

If you need to restore a backup image or files using Symantec Recovery Disk (due to the inability of being able to boot properly into the operating system and you have lost hardware, data, or program files on a drive), you can use the product CD to boot the computer into the recovery environment.

Note: The recovery environment requires a minimum of 256 MB of RAM to run.

To boot a computer into the recovery environment

1. If you want to use a USB device while you are running the recovery environment, you must first attach the device, then continue with the next step.
   See "Running USB devices" on page 123.
2. Insert the product CD into the media drive of the computer.
3. Restart the computer.
   You may need to modify your system to make it bootable from the CD.
   See "I cannot boot the computer from the CD" on page 121.
4. As soon as you see the prompt "Press any key to boot from CD" appears, press a key to begin booting into the recovery environment.
5. If you need to install storage drivers for the computer's hard disk subsystem, press **F6** when prompted while booting into the recovery environment.
   See "I cannot access (or see) the local drive where my backups are saved" on page 121.

   Note: You should always use the latest Windows XP or Windows 2003 Server version of the particular storage driver.
6. Select the language you want, then click the arrow.
7. Read the license agreement, then click **Accept**.
   If you decline, you cannot start the recovery environment and your computer will reboot.
8. Depending whether you need to access the network, click **Yes** or **No** to start networking services.

Note: If you want to see backup image file dates and times correctly you may need to set the correct time zone while in the recovery environment.

Click the time zone field at the bottom of the main window. In the Select Time Zone dialog box, select the time zone location you are in from the Time Zone drop-down list, then click OK.

See "Recovery environment" on page 117.

See "Using the support utilities" on page 118.

Keeping current with LiveUpdate

Using your Internet connection, you can use LiveUpdate to obtain program updates for your computer.

Program updates are minor improvements to your installed product. These differ from product upgrades, which are newer versions of entire products. Program updates that have self-installers to replace existing software code are called patches. Patches are usually created to extend operating system or hardware compatibility, adjust a performance issue, or fix bugs.

LiveUpdate automates the process of obtaining and installing program updates. It locates and obtains files from an Internet site, installs them, and then deletes the leftover files from your computer.

Chapter 4

Creating backup images

This chapter includes the following topics:

- About creating backup images
- Manually creating a backup image
- About scheduling incremental backup images
- Scheduling a backup image
- Exporting a backup image
- Deleting backup images

About creating backup images

This section contains the following information when you are creating backup images:

- Information to help you create backup images
  See "Tips for creating backup images" on page 50.
  See "Backing up dual-boot systems" on page 51.
  See "Backing up a database" on page 51.
- Information about storage locations for backup images, and their advantages and disadvantages
  See "Storing backup images" on page 52.
  See "Selecting a storage location for backup images" on page 53.
- Information about general options that you can use when creating backup images
  See "Verifying a backup image" on page 55.
  See "Setting the compression level for backup images" on page 56.
  See "Dividing a backup image file into smaller files" on page 56.

- Information about advanced options that you can use when creating backup images
  See "Advanced options for creating backup images" on page 57.

Tips for creating backup images

The following information may help when you create backup images:

- You may find it helpful to test backups. If a backup is successful and the backup image is stored in the location you want, you can use the Backup Job Wizard to create subsequent backups at regular intervals.
- Symantec LiveState Recovery does not need to be open for a backup to take place. Therefore, after you create a backup job, you can exit the product. Your computer, however, must be running so a backup or backup job can occur. To verify that a backup was made, check the information in the Backup History tab or the Events tab, both found in the advanced view.
- To test a backup job, click the Backup Jobs tab in the advanced view, then select the backup job you just created. Click Tools > Run Job Now.
- All backup jobs are saved, so you can edit or run them later.
- The security remains intact on an NTFS volume when you mount the volume using Backup Image Browser. (Security is maintained for all volumes when mounting.) If, however, you are simply viewing folders and files inside the backup image file using Backup Image Browser tool (that is, the *.v2i*, *.iv2i*, or .pqi file is not mounted), there is no security on the volume, folders, or files.
- Do not run a disk defragmentation program while a backup image is being created or unexpected results may occur.
- If you have two or more volumes that are dependent on each other or they are used as a group by a program such as a database service, you should back up the volumes together. With Symantec LiveState Recovery, you can back up multiple volumes simultaneously by selecting two or more volumes in the Create Backup Job Wizard or in the Drive Backup Wizard. Simultaneous backups provide the safest protection for shared volumes that are running data-intensive applications. Backing up volumes simultaneously also cuts down back up times and maximizes efficiency across shared data volumes.

Backing up dual-boot systems

You can back up dual-boot systems, or systems that are running more than one operating system, even if you have drives (partitions) that are hidden under the operating system where you run the product.

Everything on the drive you select is included in the backup, so it will be bootable later if you restore it. An exception to this is if you back up a bootstrapped operating system, you must back up—and then restore—every drive that includes operating system boot information for your computer to boot the same from a restored system as it did from the original configuration.

Backing up a database

Symantec LiveState Recovery helps you back up business-critical databases with less downtime than required by traditional backup methods.

Warning: Database corruption may occur if the computer is low on hard disk space when you are rebuilding a database at the same time you are running a backup image job. To avoid database corruption, you should quiesce the database before backing it up, and you should not rebuild or restore the database at the same time you are backing it up.

To back up a database

1. Quiesce the main database by doing the following:
   - Stop processing all transactions.
   - Close out pending transactions.
   - Write new transactions log files to the database.
2. Use Symantec LiveState Recovery to create a backup.
   The product snaps a “virtual volume image”.
   See “Manually creating a backup image” on page 59.
   If you run command files at different points in the back up, you can integrate those commands as part of the entire back up process.
   See “Running command files during backup image creation” on page 67.
3. Bring the database back online.

While Symantec LiveState Recovery works in the background to write the data from the virtual volume image to the backup file, your database is back up and running.

Storing backup images

You can save backup images to a local hard drive, local removable media, a network drive, or a local USB, FireWire, or REV drive.

Table 4-1 shows the advantages and disadvantages of using different locations for storing backup images.

Table 4-1 Backup image storage locations

Location	Advantages	Disadvantages
Hard drive	■ Fast create and restore ■ Can schedule unattended backups ■ Inexpensive because drive space can be overwritten repeatedly	■ Uses valuable drive space ■ Vulnerable to loss if the hard drive fails
Removable media (local)	■ Protection from hard drive failure ■ Ideal for off-site storage ■ Reserves hard drive space for other uses	■ Cannot create unattended backups; process is manual ■ Cannot create incremental backups; full backup only ■ Media can be expensive ■ Restore can be slower than from other locations, especially for individual files and folders
USB/FireWire/ REV drive (local)	■ Fast create and restore ■ Can schedule unattended backups ■ Inexpensive because drive space can be overwritten repeatedly ■ Off-site storage is possible ■ Reserves hard drive space for other uses	■ Additional expense for the drive itself ■ Must have supported storage device drivers to restore from Symantec Recovery Disk; could require additional media along with the Symantec Recovery Disk CD

Table 4-1 Backup image storage locations

Location	Advantages	Disadvantages
Network drive	■ Fast create and restore ■ Can schedule unattended backups ■ Inexpensive because drive space can be overwritten repeatedly ■ Protection from local hard drive failure ■ Off-site storage (through existing network backup strategies)	■ Must have supported NIC drivers to restore from Symantec Recovery Disk ■ Must understand and assign the appropriate rights for the users who will perform backups and restores

Selecting a storage location for backup images

When you create or schedule a backup job, you can choose the location where the backup image will be stored.

You can also save time by using Options to set a default backup location that you want to use whenever a backup image is created.

See "Setting a default backup location" on page 35.

The available backup image storage location options are

- Local file
- Network file
- CD-RW/DVD-RW

Local file

If you select Local file, the backup images are stored on the hard drive of the computer that is being backed up. You need to specify the drive and folder (for example, E:\Data_Backups\) where you want the backup images stored.

Warning: It is highly recommended that you save backup images to a secondary hard drive, a network location, or removable media.

While it is possible to save the backup image to the same drive that you are backing up, it is not recommended for several reasons. As the number or size of backups grows, you will have less disk space available for regular use. Also, the backup image is included in subsequent back ups of the drive, increasing the size of those backups. And finally, if the computer suffers a catastrophic failure such

as a primary hard drive going bad, you may not be able to recover the backup image you need, even if you save the image to a different drive on the same hard drive.

Use Symantec VolumeManager™ to create new partitions on a server hard disk that are dedicated to storing backup images.

If you are managing the server remotely, the backup image will be stored on the server, not on the computer where you are running the Symantec LiveState Recovery console.

Network file

If you select Network file, the backup images are stored on the network. You need to specify the UNC path (\\server\share) to the folder on the network where you want the backup images stored. Alternatively, you can click Browse to navigate to the appropriate network folder.

When you click Next in the wizard, the Connect As window appears. Type a domain or computer name, a user name, and password, then click OK to continue with the wizard.

The user name you type must have read-write access to the network folders where the backup image files will be stored. The product uses this login information to access the network when you create a backup image.

CD-RW/DVD-RW

If you select CD-RW/DVD-RW, the backup images are stored on disk media. You need to specify the CD or DVD drive where the backup images will be sent.

Note: This option may not be available in your version of the product. To upgrade to a version that supports this option, visit sea.symantec.com.

- Make sure the media is new and blank. Partially written CD or DVD media should not be used.
- If you do not have a writable CD or DVD drive, this option will not appear. This option is available only when you are creating a backup image on a local server; that is, the console and agent are installed on the same server. This option is not available when you are creating a backup image of a remote computer.
- When you save a backup image to removable media, the files are automatically split into the correct sizes if the backup spans more than one media. The files are named according to the naming convention for spanned image files.

See "Dividing a backup image file into smaller files" on page 56.

- Because backup jobs are designed to run without user intervention (possibly when the computer is unattended), you cannot save scheduled backup images directly to removable media.

Verifying a backup image

If this option is selected in the Wizard at the time you create a backup, the backup image file or set of files will be checked to see that all of files are available, the internal data structures in the backup image match the data that is available, and the backup image can be uncompressed to create the expected amount of data (if you selected a compression level at the time of creation).

Note: Be aware that verifying an image doubles the time (approximately) required to create the backup image.

If you decide not to verify the backup image file at the time of creation, you can still check the integrity of a backup image any time after it is created by opening the file in Backup Image Browser.

See "Verifying an existing backup image using Backup Image Browser" on page 55.

Verifying an existing backup image using Backup Image Browser

You can use Verify Backup Image after an image is created to determine whether a backup image file or set of files is valid or corrupt.

To verify an existing backup image using Backup Image Browser

1. From the tree pane of Backup Image Browser, select the backup image file (*.v2i*, *.iv2i*, .pqi) you want to check.
2. Click **File** > **Verify Backup Image**.
3. When the check is complete, click **OK**.

If you prefer, you can use the Drive Backup Wizard or the Backup Job Wizard to have backup images automatically verified for integrity at the time they are created.

Setting the compression level for backup images

When you create or schedule a backup job or export a backup image file using Backup Image Browser, you can choose the compression level for the images.

Table 4-2 describes the available compression levels available:

Table 4-2 Compression levels for backup images

Compression level	Description
None	Uses no compression. This is most useful if storage space is not an issue. However, if you are saving the backup image file to a busy network drive, using high compression may be faster than no compression because there is less data to write across the network.
Standard	Uses low compression for a 40% average data compression ratio on backup image files. This is the default.
Medium	Uses medium compression for a 45% average data compression ratio on backup image files.
High	Uses high compression for a 50% average data compression ratio on backup image files. This is usually the slowest method. When a high compression backup image is created, CPU usage may be higher than normal. Other processes on the computer may also be slower. To compensate, you can adjust the operation speed of the product. This may improve the performance of other resource intensive applications that you are running at the same time. See "Setting the default operation speed" on page 36.

Dividing a backup image file into smaller files

You can split a backup image file into two or more smaller files. This feature is useful if you are creating or exporting a backup image file that you want to copy to removable media later for safekeeping. The backup image is split into smaller, more manageable segments. You can then copy the segments onto separate, removable media.

This option does not apply to scheduled backup jobs.

Note: If Symantec LiveState Recovery creates an .sv2i file in addition to the .v2i files, you need to save the .sv2i file on the same media as the first .v2i file.

If you are creating a backup of thousands of files on a computer that has low memory, splitting the backup image into smaller segments may help speed the process.

If a backup image is divided into multiple files, the filenames for subsequent files will be appended with _S01, _S02, and so forth. For example, if the default filename were C_Drive.V2i, the second filename would be C_Drive_S01.V2i, and so on.

If you are creating or exporting a backup directly to removable media, you do not need to select this option; the backup will be split into multiple files automatically to fit on the media that you selected.

Advanced options for creating backup images

When you create or schedule a backup job or export a backup image file, you can set the advanced options for the backup images.

Table 4-3 describes the advanced options that are available for backup images.

Table 4-3 Advanced options

Option	Description
Use password	If you select this option, you can specify a password for the backup image. A user must type the password before restoring a backup or opening it in Backup Image Browser. You can specify specific password criteria, if you are encrypting the backup image. See "Encrypting a backup image" on page 58. You can remove a password from a backup image file, See "Exporting a backup image" on page 75..
Use Encryption	See "Encrypting a backup image" on page 58.
Ignore bad sectors during copy	If you want the ability to create a backup even if there are bad sectors on the hard drive, select this option. Although most drives do not have bad sectors, the potential for problems increases during the lifetime of the hard drive. This option is not applicable to exporting backup image files.

Table 4-3 Advanced options

Option	Description
Disable SmartSector Copying	SmartSector technology speeds up the copying process by only copying clusters and sectors that contain data. However, in some cases, it may be desirable to copy all clusters and sectors in their original layout, whether or not they contain data. If you want to copy both used and unused clusters and sectors, select Disable SmartSector Copying. Selecting this option increases processing time and usually results in a larger backup image file size. This option is not applicable to exporting backup image files.

Encrypting a backup image

You can enhance the security of your data by using AES (Advanced Encryption Standard) to encrypt backup image files that you create or export. This is especially useful if you are storing backup image files on a network and need a high level of security protection against unauthorized access and use.

You can also encrypt backup image files that were created with earlier versions of the product by using the Export Backup Image File feature in Backup Image Browser. Be aware, however, that encrypting those files will make them readable with the current product only.

See "Exporting a backup image" on page 75.

You can view the encryption strength of a backup image at any time by viewing the properties of the file.

Encryption strengths are available in 128-bit, 192-bit, or 256-bit. While higher bit strengths require longer passwords, the result is greater security for your data. Table 4-4 explains the bit strength and required password length.

Table 4-4 Password length

Bit strength	Password length
128 (Standard)	8 characters or longer
192 (Medium)	16 characters or longer
256 (High)	32 characters or longer

You must enter the correct password before you can access or restore an encrypted backup image file.

Besides bit strength, the make-up of the password can improve the security of your data. For greatest security, passwords should use the following general rules:

- Avoid using consecutive, repeating characters (for example, BBB or 88.
- Avoid using common words that you would find in a dictionary.
- Use at least one number.
- Use both uppercase and lowercase alpha characters.
- Use at least one special character such as ({}[],.<>;:'"?/|\`~!@#$%›&*()_-+=).
- Change the password after a set period of time using the Export Backup Image File feature in Backup Image Browser.

Note: Passwords are case-sensitive. When you access or restore a password encrypted backup image file, the product will prompt you for the password. If you do not enter the correct password, or you forget the password, you will not be able to open the backup image. Store the password in a secure place; Symantec has no method for opening encrypted backup image files.

Manually creating a backup image

You can create a *backup image* manually. This is particularly useful if you are about to install a new product, some critical files have changed, or many file changes have occurred in a session, and you need to create a backup immediately.

You can also make an initial backup image file of a computer to ensure the back up is successful, then use the Schedule Incremental Backups (Backup Job Wizard) feature to automate the creation of any subsequent backups during a specific day and time, or during a particular event such as logging off or installing a program.

You can schedule the creation of backup images instead of creating them manually.

See "About scheduling incremental backup images" on page 62.

You can backup a database.

See "Backing up a database" on page 51.

Symantec LiveState Recovery supports saving backup image files to a network hard disk or to a local hard disk (including USB and FireWire drives, Zip, JAZ, and magneto-optical). It does not support saving backup image files directly to a

tape drive. To save backups to tape, save the backup to another drive, then use your existing tape backup strategy to save the backup image to tape.

To manually create a backup image

1. In the tree pane of the Symantec LiveState Recovery console, select a computer that contains the drives you want to back up.
2. From the advanced view of the console, click the **Drives** tab, then click **Tools** > **Back Up Drive**.
   See "Adding groups of computers to the console" on page 23 if you need to add computers to the console.
   Notice in the Drives tab window that any unprotected drives (that is, drives that have not yet had the "Backup Drive" job run on them) are labeled blank in the Last Backup column.
3. Click **Next**.
4. Select one or more drives to back up.
   A separate backup image file will be created for each drive you select.
   You can click a drive letter to view a graphical representation of the drive's used and total free space.
   A drive with a red "X" next to it indicates that the drive is not available for backing up, usually because the drive has been deleted or the entire hard disk has been removed from the computer since you installed the product.
5. Click **Next**.
6. Select the location where you want the backup images stored:
   - Local file
   - Network file
   - CD-RW/DVD-RW

   If you receive a message stating that there may not be enough available space at the specified location, you should specify a new location rather than continuing with the Wizard and possibly not being able to save a complete backup image.
   See "Storing backup images" on page 52.
   See "Selecting a storage location for backup images" on page 53.
7. In the Backup Location dialog box, click **Rename**, then type a new file name if you want to rename the backup image instead of using the default file name.
8. Click **Next**.
9. In the Options dialog box, from the **Compression** drop-down list, select the compression level for the backup image.

- None
- Standard
- Medium
- High

See "Setting the compression level for backup images" on page 56.
Results may vary depending on the types of files saved in the drive that you are backing up.

10 Select **Verify backup image after creation** if you want to determine whether a backup image file or set of files is valid or corrupt immediately following its creation.

11 Select **Divide the backup image into smaller files to simplify archiving**, then type the maximum size (in MB) for each file, if you want to split the backup image file into small segments.
For example, if you plan to copy a backup image to CDs, specify a file size of 700 MB or less.
See "Dividing a backup image file into smaller files" on page 56.

12 In the Description text box, type a description that you want associated with the backup image.

13 Click **Advanced**.

14 In the Advanced Options dialog box, select the options you want to use such as encrypting the backup image, then click **OK**. Your options are:

- Use password
- Use encryption
- Ignore bad sectors during copy
- Disable SmartSector Copying

See "Advanced options for creating backup images" on page 57.

15 Click **Next**.

16 If appropriate, specify a command file (.exe, .cmd, .bat) from each drop-down list to run during a particular stage in the backup image creation process, then specify the amount of time (in seconds) you want the command to run before it is stopped.
If you just added the command file to the CommandFiles folder, you may need to click Back, then Next to see the files in each stage's drop-down list.

- Before data capture
- After data capture
- After image file creation

See "Running command files during backup image creation" on page 67.

17 Click **Next**.

18 In the Completing the Backup Job Wizard dialog box, review the backup options you have selected.

19 In the Progress and Performance dialog box, do one of the following:

- Drag the slider left or right to adjust the operation speed of the product while the backup is being created.
  See "Setting the default operation speed" on page 36.
- Click **Cancel Operation** to stop the creation of the backup.
- Click **Close** during the creation of the backup to close the wizard and return to the console; the backup will continue.
- Click **Close** after the creation of the backup to close the wizard and return to the console.

About scheduling incremental backup images

You can create backup jobs to automate the creation of backup images using a daily, weekly, or monthly schedule. This backup method is useful if you want to create full backup images during off-hours when you are not present or if you want to create a baseline with *incremental backup* images without interrupting your normal workflow.

While the computer must be turned on to perform a backup at the scheduled time, the console does not need to be open for the scheduled backup job to take place. nor does a user have to be logged into the computer.

You can manually create backup images instead of scheduling them.

See "Manually creating a backup image" on page 59.

You can backup a database.

See "Backing up a database" on page 51.

To verify that a backup completed as scheduled, you can open the product and check the information in the Backup History tab or the Events tab, both found in the advanced view.

Note: Symantec LiveState Recovery supports saving backup image files to a network hard disk or to a local hard disk (including USB, Firewire, Zip, Jaz, and REV drives, and magneto-optical devices). It does not support saving backup image files directly to a tape drive. To save backups to tape, save the backup to another drive, then use your existing tape backup strategy to save the backup image file to tape.

Working with full backups and incrementals

There are two types of backup images that you can schedule: Full backups and base with incremental backups.

Full backups

A full backup has the following advantages and disadvantages:

- A full backup image backs up the entire selected drive.
- A scheduled full backup cannot be saved to removable media. To save a full backup to removable media, create the backup manually using the Drive Backup Wizard.
- A full backup image is not associated with incremental backup images in any way. Full backups stand on their own, so using full backups is a less complicated backup method than using a base with incrementals.
  You can take a full backup image of a drive (using the Run Job Now feature) even if that drive is currently being tracked using Base with Incrementals.
  See "Running a scheduled backup job immediately" on page 73.

Incrementals

Note: This feature may not be available in your version of the product. To upgrade to a version that supports this feature, visit sea.symantec.com.

An incremental backup has the following advantages and disadvantages:

- An incremental backup image saves only the hard disk sectors that have changed since the baseline image or the previous incremental backup was created.
- A baseline image is the same as a full backup image, except that it has incremental tracking turned on for the selected drive.
- A baseline image is associated only with its own incremental backup files.
- Incremental backup images require less time to create than full backups and make better use of storage media.
- Event monitors can be used to trigger the automatic creation of incremental images.
- The Backup Job Wizard does not let you save base with incrementals to removable media.
- When using incremental backup images on a monitored volume, if the computer loses power or is shut down abnormally, then on reboot an

attempt is made to create an incremental backup image based on the last incremental backup image. (The reconciliation could take as long as a full backup.)

- If you use a base with incrementals to back up a hard drive, when you restore to a given point-in-time, the baseline image plus all the incrementals taken up to that point-in-time are used for the restore.
  For example, suppose you have a baseline image with eight incremental backups. You decide to restore to the point-in-time that the fourth incremental was taken. When you restore, the baseline image and the first four incrementals are used to restore the backup.
- When you create a base with incrementals, if you select a hidden drive (partition) and a non-hidden partition in the same backup image job, the hidden partition will only be backed up when a base image is specified; no incremental backup images will be created.
- Incremental images can be consolidated, thus reducing the restore to the baseline image and a consolidated incremental image.

Note: The baseline image and all associated incremental backups must be kept together in the same folder. If any image is missing, the backup *image set* becomes invalid and you will not be able to restore the data.

Scheduling options

Table 4-5 describes the backup image schedule options that are available:

Table 4-5 Backup image schedule options

Option	Description
Once	One full backup image is created at the date and time you specify. This option applies to Full Backups only.
Weekly	Full Backups: A full backup image is created at the time and days of the week you specify. Base with Incrementals: A base backup image is created at the time and days you specify; incremental backup images are created at the time and interval you specify.

Table 4-5 Backup image schedule options

Option	Description
Monthly	Full Backups: A full backup image is created at the time and days of the month you specify. Base with Incrementals: A base backup image is created at the time and days of the month you specify; incremental backup images are created at the time and on the days of the week you specify.
No schedule (save for later)	Save all the backup settings except the schedule. You can later run the backup job at your convenience. **To run the backup job later** 1 In the advanced view, click the **Backup Jobs** tab. 2 Select the backup job. 3 On the Tools menu, click **Run Job Now**. You can also run the backup from the Tray icon. **To assign a schedule to the backup job** 1 In the advanced view, click the **Backup Jobs** tab. 2 Select the backup job. 3 On the Tools menu, click **Edit Job**, then complete the steps in the wizard.

Event options

When you create a base with incrementals backup job, you can select which events will trigger the automatic creation of incremental images. For example, at the time you log off of a computer or install an application, you can have the product create an incremental image.

Note: This feature may not be available in your version of the product. To upgrade to a version that supports this feature, visit sea.symantec.com.

Table 4-6 outlines the event options you can enable when you create a base with incrementals.

Table 4-6 Event options

Event	Description
Any user logs on to the computer	An incremental backup is created at the time a user logs on to the computer where the agent is installed.

Table 4-6 Event options

Event	Description
Any user logs off the computer	An incremental backup is created at the time a user logs off the computer where the agent is installed.
Any application gets installed	An incremental backup is created at the time a user installs an application on the computer where the agent is installed.
The changes on a drive in this job exceed X number of megabytes	An incremental backup is created when changes to the hard drive on the computer where the agent is installed exceed a specified number of megabytes.

Consolidating incremental backup images

The baseline image and all of its incrementals taken up to a specific point-in-time are required when restoring a backup image to a given point-in-time. Depending on the duration of the backup job, there could be a lot of incremental backup images. You can reduce the amount of storage space for the backup by consolidating multiple incremental backup images to a single incremental backup image. (The baseline image is still required for a restore.)

Note: This feature may not be available in your version of the product. To upgrade to a version that supports this feature, visit sea.symantec.com.

While consolidating incremental backup images may save disk space and provide a method to take frequent backups during the day while consolidating incremental backups for previous days, depending on the number of incremental image files that have been consolidated, additional memory may be required for restoring or browsing a consolidated incremental image file. Additionally, consolidating backup images over the network may increase network traffic significantly.

Table 4-7 outlines the consolidation options you can set when you schedule a base with incrementals or manually consolidate incremental images.

Table 4-7 Consolidation options

Consolidation	Description
None	No consolidation of incremental images is performed.
Seldom	A consolidation of incremental images more than 12 hours old is performed every 12 hours. Also, after the first incremental of the day is taken, all incremental files from two days previous are consolidated to a single file.

Table 4-7 Consolidation options

Consolidation	Description
Frequent	A consolidation of incremental images more than 4 hours old is performed every 4 hours. Also, after the first incremental of the day is taken, all incremental files from the two days previous are consolidated to a single file.

See "Scheduling a backup image" on page 69.

To consolidate incremental images manually

1. In the tree pane of the product console, select a server that contains the volumes whose incremental backups you want to consolidate, then click the **Backup History** tab.
2. In the list box, select a backup.
3. On the Tools menu, click **Consolidate Incremental Backups**.
4. Select a range of incremental backups you want to consolidate, then click **OK**.
5. Click **Yes** to consolidate the selected range of incrementals into a single incremental image file.

See "Consolidating incremental backup images" on page 66.

Running command files during backup image creation

To integrate with any backup routines you may be running on the server or to integrate with applications that may be using a volume on the server, you can specify command files (.exe, .cmd, .bat) to run at three different stages during the creation of a backup image:

- Before data capture
- After data capture
- After image file creation

You can also specify the amount of time (in seconds) that a command file should be allowed to run.

Any command files that you specify in the Command Files dialog of the wizard must first be installed by copying them into the CommandFiles folder of the server you are backing up. (The default path is \Program Files\Symantec\Symantec LiveState Recovery\Agent\CommandFiles.) Be sure you have the necessary rights to run each installed command file.

To use a Visual Basic script file (.VBS) during a backup you can create a batch file (.BAT) that will run the script. For example, you could create a batch file called STOP.BAT that contains the following syntax:

```
Cscript script_filename.vbs
```

Make sure that **Cscript** precedes the Visual Basic script filename.

Warning: The command files you install and use cannot depend on any user interaction or have a visible user interface while they are running during a backup. You should test all command files you intend to use, outside of the product, before using them in a backup image process.

When the actual backup image creation begins, the command file is run during the specified stage. If an error occurs while a command file is running or the command file does not finish in the time you specified (regardless of the stage), the entire backup image creation is ended, the command file is stopped (if necessary), and the error information is logged and displayed.

Table 4-8 describes the three stages of backup image creation.

Table 4-8 Backup image file creation stages

Stage	Description
Before data capture	This stage occurs before the virtual volume image is created. Running a command during this stage lets you prepare for the backup image creation process by stopping (or notifying) any open applications that are using the volume, for example. **Note:** If you use this stage option, be sure the command file has an error recovery mechanism built into it. If the server has one or more services that must be stopped at this stage, and the command file does not contain any form of error recovery, one or more of the stopped services may not be restarted. This will cause the entire backup image creation process to end immediately; no other command files will run. For more information about virtual volume images and how they are created with Symantec LiveState Recovery, see "How the product works" on page 12.
After data capture	This stage occurs after the virtual volume image is created. Running a command during this stage is typically a safe point for allowing you or services to resume normal activity on the volume.

Table 4-8 Backup image file creation stages

Stage	Description
After image file creation	This stage occurs after the actual backup image file is created. Running a command during this stage lets you act on the backup image file itself by copying the backup image file to an offline location, for example.

Scheduling a backup image

You can automate the creation of backup images using a daily, weekly, or monthly schedule. If you are creating a base with incrementals, you can also specify that certain events, such as logging on or off a computer, create an incremental image.

See "Working with full backups and incrementals" on page 63.

To schedule a backup image

1. In the tree pane of the product console, select a computer that contains the drives you want to back up.
   If you need to add computers to the console, see "Adding groups of computers to the console" on page 23.
2. Do one of the following:
   - In the advanced view, click the **Drives** tab, then click **Tools** > **Create Backup Job**.
     In the Drives tab window, any unprotected drives (that is, drives that have not yet had the "Backup Drive" job run on them) are labeled blank in the Last Backup column.
   - From the basic view, click **Schedule Incremental Backups**.
3. Click **Next**.
4. In the Backup Type dialog box, click one of the following:
   - **Full Backups**
   - **Base with Incrementals**.

   See "Working with full backups and incrementals" on page 63.
5. Select one or more drives to back up.
   Shift-click to select a group of contiguous drives, or Ctrl-click to select non-contiguous drives.
   A separate backup image file will be created for each drive you select.
   You can click a drive letter to view a graphical representation of the drive's used and total free space.

A drive with a red “X” next to it indicates that the drive is not available for backing up, usually because the drive has been deleted or the entire hard disk has been removed from the computer since you installed the product.

When you create a base with incrementals, if you select a hidden drive (partition) and a non-hidden partition in the same backup image job, the hidden partition will only be backed up when a base image is specified; no incremental backup images will be created.

6 Click **Next**.

7 Select the location where you want the backup images stored.

- Local file
- Network file

If you receive a message stating that there may not be enough available space at the specified location, you should specify a new location rather than continuing with the Wizard and possibly not being able to save a complete backup image.

Because backup jobs are designed to run without user intervention (possibly when the computer is unattended), you cannot save incremental backups directly to removable media.

See “Storing backup images” on page 52.

See “Selecting a storage location for backup images” on page 53.

8 In the Backup Location dialog box, click **Rename**, then type a new file name if you want to rename the backup image instead of using the default file name.

By default, filenames for scheduled full backup or base images will be appended with 001.v2i, 002.v2i, and so forth. Filenames for incremental backups based on the base image will be appended with _i001.iv2i, _i002.iv2i, and so forth. So, if your base image were called C_Drive001.v2i, the first incremental backup would be called C_Drive001_i001.iv2i.

9 Click **Next**.

10 Specify the frequency and time of the backup images. Your options are

- Once (applies to full backups only)
- Weekly
- Monthly
- No schedule (save for later)

See “Scheduling options” on page 64.

Be aware that the time specified is relative to the Symantec LiveState Recovery console. If you are managing computers in a time zone that is different from the computer where the console is running, you should adjust backup times accordingly.

11 Click **Next**.

12 If you are creating a base with incrementals, select the events that will automatically create an incremental backup. Your options are

- Any user logs on to the computer
- Any user logs off the computer
- Any application gets installed
- The changes on a drive in this job exceed “x” number of megabytes

See “Event options” on page 65.

13 In the Options dialog box, from the **Compression** drop-down list, select the compression level for the backup image.

- None
- Standard
- Medium
- High

See “Setting the compression level for backup images” on page 56.
Results may vary depending on the types of files saved in the drive you are backing up.

14 To determine whether a backup image file or set of files is valid or corrupt immediately following its creation, select **Verify backup image after creation**.
See “Verifying an existing backup image using Backup Image Browser” on page 55.

15 To break the backup image file into small segments, select **Divide the backup image into smaller files to simplify archiving**, then type the maximum size (in MB) for each file.
For example, if you plan to copy a backup image to CDs, specify a file size of 700 MB or less.
See “Dividing a backup image file into smaller files” on page 56.

16 To limit the number of full or baseline backup images saved for each drive, select **Limit the number of backups saved for each drive**, then type a number in the text field.
When this limit is reached, each successive backup image (whether full or base) is first created and stored, then the oldest, previously created backup image file is deleted (including all associated incrementals if it is a base image) from the same storage location.
Be sure you have enough hard disk space to accommodate the number of backup images you specify, plus one additional backup image.

If you run out of hard disk space before the number of specified backup images is reached, the recurring backup image process will no longer complete successfully and a current backup image will not be created.

17 In the **Consolidate incrementals** drop-down list, select how often you want incremental backup images consolidated.

- Never
- Seldom
- Frequent

See "Consolidating incremental backup images" on page 66.

18 In the Description text box, type a description that you want associated with the backup image.

19 Click **Advanced**.

20 In the Advanced Options dialog box, select the options you want to use such as encrypting the backup image, then click **OK**. Your options are

- Use password
- Use Encryption
- Ignore bad sectors during copy
- Disable SmartSector Copying

See "Advanced options for creating backup images" on page 57.

21 Click **Next**.

22 If appropriate, specify a command file (.exe, .cmd, .bat) from each drop-down list to run during a particular stage in the backup image creation process, then specify the amount of time (in seconds) you want the command to run before it is stopped.

If you just added the command file to the CommandFiles folder, you may need to click Back, then Next to see the files in each stage's drop-down list.

- Before data capture
- After data capture
- After backup file creation

See "Running command files during backup image creation" on page 67.

23 Click **Next**.

24 In the Completing the Backup Job Wizard dialog box, review the backup options you have selected.

25 To create a backup immediately, click **Create the first backup now** if you want the product.

26 Click **Finish** to create the backup image.

When the backup begins, you can watch its progress in the Progress and Performance dialog box.

27 In the Progress and Performance dialog box, do one of the following:

- Drag the slider left or right to adjust the operation speed of the product while the backup is being created.
  See "Setting the default operation speed" on page 36.
- Click **Cancel Operation** to stop the creation of the backup.
- Click **Close** during the creation of the backup to close the wizard and return to the console; the backup will continue.
- Click **Close** after the creation of the backup to close the wizard and return to the console.

Running a scheduled backup job immediately

You can use Run Job Now to create, on demand, a full backup image, a baseline backup image, or an *incremental backup* image of the drive's most recent changes.

For example, you can take a full backup image of a drive even when that drive is currently being tracked using a base with incrementals job.

To use the Run Job Now feature, you must have already created a backup job.

See "About scheduling incremental backup images" on page 62.

To run a scheduled backup job immediately

1 In the tree pane of the console, select a server that contains a volume with a backup image schedule, then click the **Backup Jobs** tab.

2 In the list box, select a backup job name.

3 On the Tools menu, click **Run Job Now**.

4 In the Backup Type dialog box, click the option you want.

A full independent backup	Creates a full backup image using the options saved in the job. Available for full backup and base with incremental jobs.
A baseline backup	Create a baseline backup image of the selected drives. See "Working with full backups and incrementals" on page 63. Available for base with incremental jobs only.

An incremental backup of recent changes	Creates an incremental backup image using the options saved in the job. Available for base with incremental jobs only.

5 Click **OK**.

Editing a backup job schedule

You can edit any of the schedule properties for a backup job, except the selected drives.

To edit a backup job schedule

1 In the tree pane of the console, select a server that contains a volume with a backup image schedule, then click the **Backup Jobs** tab.

2 In the list box, select a backup job.

3 On the Tools menu, click **Edit Job** to open the selected job in the Backup Job Wizard and change its properties.

Disabling a backup job schedule

You can disable or “turn off” a backup schedule, then enable it later.

To disable a backup job schedule

1 From the tree pane of the console, select a server that contains a volume with a backup image schedule, then click the **Backup Jobs** tab.

2 In the list box, select a backup job.

3 On the Tools menu, click **Disable Schedule**.
To enable the job, click **Enable Schedule**.

Deleting a backup job schedule

You can delete a backup schedule when you no longer need it.

To delete a backup job schedule

1 From the tree pane of the console, select a server that contains a volume with a backup image schedule, then click the **Backup Jobs** tab.

2 In the list box, select a backup job.

3 On the Tools menu, click **Remove Job**.

Exporting a backup image

You can export an open backup image file in Backup Image Browser to accommodate various methods of archiving or to make a copy of a backup with different characteristics than the original. Be aware that exporting does not modify an existing backup image; rather, it copies the backup image and assigns the new characteristics to the copied file.

See "Using Backup Image Browser" on page 38.

Exporting a backup lets you do the following:

- Split the file into smaller sizes so it can be copied to other types of storage media.
- Consolidate a spanned set into one backup image file.
- Consolidate an incremental set (a base backup image and all associated *incremental backup* images) into one backup image file or a spanned set.
- Change the description or compression level of the backup image.
- Add a password to the backup image.
- Encrypt a backup image.

To export a backup image

1. In the tree pane of Backup Image Browser, select the backup image file that you want to export.
2. On the File menu, click **Export Backup Image**.
3. In the Export Backup Image File dialog box, in the Filename text box, do one of the following:
   - If you want to store the backup image on the local computer, type the drive, folder, and filename.
     For example, **E:\Data_Backups\vol_1.v2i**
   - If you want to store the backup image on the network, type the appropriate *UNC (Universal Naming Convention)* path, or click **Browse** to navigate to the network folder, and then type the filename.

   See "Selecting a storage location for backup images" on page 53.

   The new filename must have a .v2i extension. You cannot choose the same location and filename as the existing backup image.
4. To break the backup image file into small segments, select **Divide the backup image into smaller files for archiving**, then select the maximum size for each file from the drop-down list.
   For example, if you plan to copy a backup image to CDs, select a file size of 700 MB or less.

See “Dividing a backup image file into smaller files” on page 56.

5 In the Description text box, type a description that you want associated with the backup image.

6 In the Compression Level group box, select one of the following compression levels for the exported backup image.

- None
- Standard
- Medium
- High

See “Setting the compression level for backup images” on page 56.

Results may vary depending on the types of files saved in the backup image that you are exporting.

Even if the backup image was previously compressed when it was initially created, you are exporting the file as a new backup image and, therefore, the compression level can be reset to what you want.

7 In the Security Options group box, select **Use Password**, if you want to assign a password to the exported backup image.

8 Type the password in the Password and Confirm Password text boxes.

A user must type this password before restoring a backup or opening it in Backup Image Browser.

To remove a password from a backup image file, make sure **Use password** is not selected.

9 To encrypt the exported backup image, select **Encrypt backup image**.

See “Encrypting a backup image” on page 58.

10 Select one of the following encryption strengths.

- Standard
- Medium
- High

Depending on the strength of encryption you have selected, you may need to re-type your password to meet the minimum required password length.

11 Click **OK**.

Deleting backup images

You can delete backup images when they are no longer needed or when you need to make more space available in the backup location.

Warning: Be aware that the Backup History tab in the advanced view of the product will not be updated to reflect the deletion. Also, if you delete any file that is part of a backup set (a base backup image with incremental backups), you will not be able to recover data from the remaining backup files in that set.

To delete backup images

1 In Windows Explorer, select the .v2i or .iv2i file that you no longer need.

2 Press **Delete**.

Chapter 5

Restoring files and folders

This chapter includes the following topics:

- About restoring files and folders
- Restoring files from a backup image
- Mounting a drive within a backup
- Restoring files using the recovery environment
- Viewing the properties of a backup image
- Viewing the drive properties of a backup image
- Viewing a file within a backup image

About restoring files and folders

There are two different methods you can use to restore files and folders on a computer. Each restore method takes into account the functionality that is or is not available on the computer. In many instances, you do not need to take the computer down to complete a restoration.

Table 5-1 describes the two methods for restoring files and folders within backup images.

Table 5-1 Methods for restoring files and folders

Problem	Restore method
You can boot into the operating system on the computer but you have lost data, programs, or hardware files on a drive (excluding operating system files).	Restore selected files and folders from a backup image using Backup Image Browser within Windows. See "Restoring files from a backup image" on page 80. See "Using Backup Image Browser" on page 38. The computer does not require a restart before you can access files.
You cannot boot into the operating system, and you have lost hardware, data, or program files on a drive.	Restore selected files and folders from inside a backup image using Backup Image Browser from the recovery environment (*Symantec Recovery Disk*). See "Restoring files using the recovery environment" on page 83. See "Using Backup Image Browser" on page 38. See "Recovery environment" on page 117. See "Using the support utilities" on page 118. The computer requires a restart before you can access files.

Restoring files from a backup image

If you are able to run the operating system on a troubled computer, you can use Backup Image Browser to restore individual files or folders from a *backup image*—all with zero downtime to the computer. This method of recovery, known as a *hot restore*, is useful if you have traced the cause of a computer failure to a certain file or folder of files, or you have simply lost important data files and do not want to restore an entire backup image using the Restore Drive Wizard.

Warning: You can open files from within a backup image. However, you must restore a file from within a backup image before making any modifications to it, or your changes will be lost.

If your backup image is on removable media, copy the segments of the backup to a fixed drive and restore files from the fixed drive.

To restore files from a backup image

1. Open a backup image in Backup Image Browser.
   See "Opening or closing a backup image" on page 39.
2. In the tree pane of Backup Image Browser, you may need to double-click the backup image file (*.v2i*, *.iv2i*, or .pqi) to see the drives inside it.
3. Double-click the desired drive that contains the folders or files you want to restore.
4. Select the files or folders you want to restore.
   Press Ctrl+A to select all items.
   To select a group of files that are next to each other, click the top file, then hold down Shift and click the last file in the list.
   To select a group of files that are not next to each other, hold down Ctrl while selecting the files you want.
5. On the File menu, click **Restore**.
   Where possible, the Restore Items dialog will automatically fill in the Restore to this folder text field with the original path where the backup image was created.
   If the original location does not include a drive letter (because the drive was hidden when you created the backup image), you must enter a drive letter for the drive before you can restore any files or folders.
   If the original path is unknown, or you want to restore the selected files to a different location, click **Browse** to locate the destination.
6. Click **Restore** to begin restoring the files.
   When file restoration is complete, you are returned to the main window of Backup Image Browser.

Mounting a drive within a backup

You can mount a drive within a *backup image* file (*.v2i*, *.iv2i*, or .pqi) by assigning a drive letter that is visible from Backup Image Browser and Windows Explorer. You can perform a variety of tasks on the drive such as run ScanDisk (or CHKDSK), perform a virus check, copy folders or files to an alternate location, or simply view disk information about the drive, such as used space and free space. You may also be able to run executable programs that exist within the mounted backup image.

When a drive is mounted, you can set it up as a shared drive. Users on a network can connect to the shared drive and restore files and folders from within the backup image.

You can mount one or more backup images at a time. The drives will remain mounted until you dismount them or restart the computer. Mounted drives do not take up extra hard disk space.

All security on NTFS volumes remains intact when it is mounted.

It is not necessary to mount a drive to restore files or folders from within a backup image.

Warning: Any data written to a mounted V2i drive—including creating, modifying, or deleting files—will be lost when the volume is dismounted.

Mount a drive within a backup

You can mount a drive from Backup Image Browser, from a backup image in Windows Explorer, or **from a drive letter in Windows Explorer.**

To mount a drive within a backup using Backup Image Browser

1. In the tree pane of Backup Image Browser, select the backup image file that contains the drive you want to mount.
2. On the File menu, click **Mount V2i Drive**.
3. In the Mount V2i Drive dialog box, select the drive label you want mounted.
4. In the **Drive letter** drop-down list, choose a letter you want associated with the drive.
5. Click **OK**.

To mount a drive within a backup using Windows Explorer

1. In Windows Explorer, navigate to a backup image file.
2. Right-click the backup image file, then click **Mount**.
3. In the Mount V2i Drive dialog box, select the drive label you want mounted.
4. In the **Drive letter** drop-down list, choose a letter you want associated with the drive.
5. Click **OK**.

To mount a drive within a backup using a drive letter in Windows Explorer

1. In Windows Explorer, right-click on a drive letter that has been backed up.
2. Click **Properties**.
3. In the Properties dialog box, click the **LiveState Recovery** tab.
4. In the Backup History list box, select a backup image, then click **Mount**.

5 In the Mount V2i Drive dialog box, select the drive label you want mounted.

6 In the **Drive letter** drop-down list, choose a letter you want associated with the drive.

7 Click **OK**.

The mounted V2i drive appears in the tree pane of Backup Image Browser and Windows Explorer is automatically opened to the drive letter of the mounted drive.

Dismounting a backup drive

You can dismount all V2i drives by rebooting the computer. You can also dismount V2i drives one at a time by using Backup Image Browser or Windows Explorer.

Dismount a backup drive

You can dismount a drive in Backup Image Browser, dismount all drives in Backup Image Browser, or dismount a drive in Windows Explorer.

To dismount a backup drive using Backup Image Browser

1 In the tree pane of Backup Image Browser, select a mounted *backup image* file.

2 On the File menu, click **Dismount V2i Drive**.

To dismount all backup drives using Backup Image Browser

1 In the tree pane of Backup Image Browser, click **Mounted V2i Drives** in the tree pane.

2 On the File menu, click **Dismount All V2i Drives**.

To dismount a backup drive using Windows Explorer

1 In Windows Explorer, navigate to the mounted V2i drive.

2 Right-click the drive, then click **Dismount V2i Drive**.

Restoring files using the recovery environment

You can use the *Symantec Recovery Disk* to boot into the recovery environment and restore files from within a backup image.

When you are running the recovery environment, there are several support utilities available that you can run to troubleshoot networking or hardware

issues you may encounter. For example, you can ping a server, renew IP addresses, or get information about a hard disk partition table.

See "Recovery environment" on page 117.

See "Using the support utilities" on page 118.

To restore files using the recovery environment

1. Boot the computer into the recovery environment main window.
   See "Booting a computer into the recovery environment" on page 45.
2. Click **Advanced Recovery Tasks**.
3. Click **Browse backup image files**.
4. In the Open dialog, open the backup image file that contains the backup image folders or files you want to restore.
   Drive letters under Symantec Recovery Disk may not match those in the Windows environment.
5. In the tree view pane of Backup Image Browser, double-click the desired drive.
   You can also click **File** > **Open** to locate the backup image file you want. If you are unable to see or browse the network from the Open dialog, type the name of the server and share that holds your backup images, in the File name text box (syntax example: \\server_name\share_name), then press **Enter**.
   Select a backup image file, then click **Open** to add it to the tree view pane of Backup Image Browser. Double-click the backup image filename to display the available drives.
   If you are still unable to see your network after typing the server name and share name, you may need to map a drive to see and browse the network.
   See "Network connectivity during a restore" on page 125.
6. In the content pane of Backup Image Browser, select the files or folders you want to restore.
   - Press Ctrl+A to select all items.
   - To select a group of files that are next to each other, click the top file, then hold down Shift and click the last file in the list.
   - To select a group of files that are not next to each other, hold down Ctrl while selecting the files.
7. On the File menu, click **Restore**.
   Where possible, the Restore Items dialog box will automatically fill in the Restore to this folder text box with the original path where the backup image was created.

If the original location does not include a drive letter (because the drive was hidden when you created the backup image), you must enter a drive letter for the drive before you can restore any files or folders.
If the original path is unknown, or you want to restore the selected files to a different location, click **Browse** to locate the destination.

8 Click **Restore** to restore the files.

Viewing the properties of a backup image

You can view various properties of a backup image using Backup Image Browser.

Table 5-2 describes the backup image properties available.

Table 5-2 Backup image properties

Image property	Description
Description	A user-assigned comment associated with the backup image
Size	The total size (in megabytes) of the backup image
Created	The date and time that the backup image file was created
Compression	The compression level used in the backup image
Spanned	Whether the entire backup image file is spanned over several files
Password protected	The password protection status of the selected drive
Encryption	The encryption strength used with the backup image
Version	The version number of the backup image file
Computer name	The name of the computer on which the backup image was created

To view the properties of a backup image

1 In the tree pane of Backup Image Browser, select the desired backup image file.

2 Do one of the following:

- On the File menu, click **Properties**.
- Right-click the backup image file and click **Properties**.

Viewing the drive properties of a backup image

You can view various drive properties of a backup image using Backup Image Browser.

Table 5-3 describes the backup image drive properties available.

Table 5-3 Backup image drive properties

Drive property	Description
Description	A user-assigned comment associated with the drive
Original drive letter	The original drive letter that was assigned to the drive
Cluster size	The *cluster* size (in bytes) used in a FAT, FAT32, or NTFS drive
File system	The file system type (for example, FAT, FAT32, and NTFS) used in the drive
Primary/Logical	The selected drive's drive status as either Primary (*primary partition*) or Logical (*logical partition*)
Size	The total size (in megabytes) of the drive, including both used and free space
Used space	The amount of used space (in megabytes) in the drive
Unused space	The amount of free or unused space (in megabytes) in the drive

To view the drive properties of a backup image

1. In the tree pane of Backup Image Browser, double-click the backup image file that contains the desired drive (or volume).
2. Select a drive.
3. Do one of the following:
   - On the File menu, click **Properties**.
   - Right-click the drive and click **Properties**.

Viewing a file within a backup image

After opening a backup image in Backup Image Browser, you can view any file within the backup image using the program associated with that file type. (If a particular file type is not associated with a program, you can select the program you want to use from the Microsoft Open With dialog box.)

You cannot view encrypted files system (EFS) NTFS volumes using Backup Image Browser.

To view a file within a backup image

1. In the tree pane of Backup Image Browser, double-click the backup image file to reveal the list of drives.
2. In the tree pane, select a drive.
3. In the content pane, double-click a folder that contains the file you want to view.
4. Select the file.
5. On the File menu, click **View**.
   The View option is dimmed (unavailable) when you select a program file that has a .exe, .dll, or .com file extension.

Chapter 6

Restoring backup images

This chapter includes the following topics:

- About restoring a computer
- Restoring a backup image
- About restoring drives using the recovery environment
- Restoring a single drive using the recovery environment
- Restoring drives using the recovery environment
- Restoring drives using a system index file in the recovery environment

About restoring a computer

There are two different methods you can use to restore a computer to full functionality. Each restore method, described in Table 6-1, takes into account the functionality that is or is not available on the computer. In many instances, you do not need to restart the computer to complete a restoration.

Table 6-1 Methods for restoring a computer

Problem	Restore method
You can boot into the operating system on the computer but you need to restore a drive (other than the operating system partition) from a recent backup image.	Restore a full backup image. See "Restoring a backup image" on page 92. The computer does not require a restart before you can access files.

Table 6-1 Methods for restoring a computer

Problem	Restore method
The computer has one of the following problems: ■ Suffered a catastrophic failure ■ The software cannot lock a drive (*drive lock*) to perform a restoration directly under Windows ■ You cannot boot into the operating system, and you have lost hardware, data, or program files on a drive	Restore the entire drive using the System Restore Wizard from the recovery environment (*Symantec Recovery Disk*). See one of the following tasks based on your problem scenario: ■ "About restoring drives using the recovery environment" on page 94. ■ "Restoring drives using the recovery environment" on page 98. ■ "Restoring drives using a system index file in the recovery environment" on page 100. The computer requires a restart before you can access files. See "Recovery environment" on page 117.. See "Using the support utilities" on page 118..

Storage locations for restoring backup image files

Depending on where your backup images are stored, you can restore backup image files from either the connected computer or the network.

Table 6-2 describes storage locations that you can select from when restoring a backup image file.

Table 6-2 Backup image file storage locations

Restore from	Description
Local file	Selecting a local file will restore a backup image located on the connected computer. Specify a drive and folder where the backup image is stored. For example, **E:\Data_Backups**. If you are managing the computer remotely, the backup image will be stored on the computer itself, not on the computer where you are running the console. To restore a backup image that is located on disc media, insert the media in the drive, then browse to the CD or DVD drive and folder where the backup image is located.

Table 6-2 Backup image file storage locations

Restore from	Description
Network file	Selecting a network file will restore a backup image that is located on the network. Specify a *UNC (Universal Naming Convention)* path (for example, \\computer\share\file) on the network where the backup image is stored, or click Browse to navigate to the network folder where the backup image is stored. In the Restore Drive Wizard, click Next. In the Connect As dialog box, type a domain or computer name, user name, and password, then click OK to return to the wizard.

Restore options

When you restore a computer from a backup image, there are various options you can set.

Table 6-3 describes the restore options for restoring a computer.

Table 6-3 Restore options for a computer

Option	Description
Verify image file before restore	Determines whether a backup image file or set of files is valid or corrupt before restoring it. The wizard checks to see that all of the files in the backup image file or set are available, the internal data structures in the backup image match the data that is available, and the backup image can be uncompressed (if you selected a compression level at the time of creation). If the backup image is invalid, the restoration will not continue.
Check for file system errors	Checks the restored drive for errors *after* restoring the backup image file.
Resize drive to fill unallocated space	Automatically expands the drive to occupy the destination drive's remaining unallocated space.
Set drive active	Makes the restored drive the active partition (the drive the computer boots from). Only one drive can be active at a time. To boot the computer, it must be on the first drive, and it must contain an operating system. When the computer boots, it reads the partition table of the first drive to find out which drive is active and boots from that location. If the drive is not bootable or you are not certain that it is, have a Windows boot disk ready. This option is valid for *basic disks* only (not *dynamic disks*).

Table 6-3 Restore options for a computer

Option	Description
Partition type	Lets you set the partition type to one of the following: ■ A primary partition ■ A *logical partition* inside an *extended partition* This option is not applicable for dynamic disks.
Drive letter	Assigns the selected drive letter to the partition. Available in the Restore Drive Wizard only.

Restoring a backup image

If you are able to access the operating system on a troubled computer, you can use the Restore Drive Wizard to restore an entire *backup image* of a data drive—with no rebooting. This method of recovery, known as a *hot restore*, is useful if you have experienced the complete loss of a data drive.

You can restore a full image or a base image by selecting a .v2i file, or you can select an incremental backup (.iv2i file) that was taken at the point in time to which you want to restore the drive. If you select an incremental backup, the restore process will automatically detect any previous incrementals and the base image associated with that incremental.

Any drive that you restore can be automatically resized smaller to fit the selected destination (assuming the amount of data in the partition does not exceed the size of the destination drive).

For example, if you have a backup image of a 6 GB drive that contains 3 GB of data, and you want to restore the backup to a 4 GB drive, the 6 GB drive image being restored is proportionally resized down to 4 GB to fit the destination drive size.

To restore a backup image

1. In the tree pane of the console, select a computer that contains a drive you want to restore.
2. Do one of the following:
   - In the basic view, click **Restore a Drive**.
   - In the advanced view, click the **Drives** tab, select the drive you want to restore, then click **Tools** > **Restore Drive**.
3. In the Restore Drive Wizard, click **Next**.

4 Select the backup image file that you are restoring from by selecting one of the following options:

- Local file
- Network file

See "Storage locations for restoring backup image files" on page 90.

5 If the backup image is password-protected, type the password in the Password text box, then click **OK**.

6 Click **Next**.

7 In the Restore Destination window, select the destination where you want to restore the backup image file.

If there is not enough free space to restore a backup image file, you can press Shift to select multiple, contiguous destinations that exist on the same hard drive.

Some of the drives listed may be invalid selections because you may not have rights to the drive.

8 Click **Next**.

9 Set how you want the restore to be performed. Your options are

- Verify image file before restoring
- Check for file system errors
- Resize drive to fill unallocated space
- Set drive active
- Set partition type
- Select drive letter

The actual options available are dependent on the restore destination you selected in the previous step.

See "Restore options" on page 91.

10 Click **Next** to review the restore options you have selected.

11 Click **Next** to restore the image.

If the wizard cannot lock the drive ("*drive lock*") to perform the restoration under Windows, it will prompt you to insert the product CD and manually boot into the recovery environment so you can complete the restoration. When the restore is finished, the computer is rebooted automatically.

You may want to dismount the backup image after restoring it.

See "Dismounting a backup drive" on page 83.

About restoring drives using the recovery environment

If you cannot restore a file or folder while the computer is online (due to not booting properly into the OS or lacking free hard drive space), you can use the System Restore Wizard from the *Symantec Recovery Disk* to return one or more drives on the computer to full functionality.

You can also use Symantec Recovery Disk to perform a *bare metal recovery* of a computer if you have suffered a catastrophic hard drive failure.

Restore options

There are two groups of restore options: standard restore options and advanced restore options.

Table 6-4 describes the standard restore options that are available for restoring a single drive.

Table 6-4 Standard restore options for a single drive

Option	Description
Verify backup image before restore	Determines whether a backup image file or set of files is valid or corrupt before restoring it. The wizard checks to see that all of the files in the backup image file or set of files are available, the internal data structures in the backup image match the data that is available, and the backup image can be uncompressed (if you selected a compression level at the time of creation). If the backup image is invalid, the restoration will not continue. This option is selected by default.
Check for file system errors after restore	Checks the restored drive for errors *after* restoring the backup image file.
Resize drive to fill unallocated space	Automatically expands the drive to occupy the destination drive's remaining unallocated space.

Table 6-5 describes the advanced restore options that are available for restoring a single drive.

Table 6-5 Advanced restore options for a single drive

Option	Description
Set drive active	Makes the restored drive the active partition (the drive the computer boots from). Only one drive can be active at a time. To boot the computer, it must be on the first drive, and it must contain an operating system. When the computer boots, it reads the partition table of the first drive to find out which drive is active and boots from that location. If the drive is not bootable or you are not certain that it is, have a Windows boot disk ready. This option is valid for *basic disks* only (not *dynamic disks*). **Note:** If you are restoring an operating system partition from the recovery environment to a hard drive that has no other partitions, you must select this option or the operating system partition will not be active after the restore and will not boot.
Partition type	Lets you set the partition type to one of the following: ■ Primary partition ■ A *logical partition* inside an *extended partition* This option is not applicable for dynamic disks.
Drive letter	Assigns a drive letter to the partition. Available in the Restore Drive Wizard only.
Restore original disk signature	Restores the original physical disk signature of the hard drive. Disk signatures are included in Windows Server 2003, Windows 2000 Advanced Server, and Windows NT Server 4.0 Enterprise Edition (SP3 and later) and are necessary before the hard drive can be used. This option is recommended for advanced users and is available only when restoring a whole drive under the recovery environment.

Table 6-5 Advanced restore options for a single drive

Option	Description
Restore MBR	Restores the master boot record. The master boot record is contained in the first sector of the first physical hard drive. The MBR consists of a master boot program and a partition table that describes the disk partitions. The master boot program looks at the partition table to see which primary partition is active. It then starts the boot program from the boot sector of the active partition. This option is recommended for advanced users and is available only when restoring a whole drive under the recovery environment.

Restoring a single drive using the recovery environment

You can use the System Restore Wizard from the *Symantec Recovery Disk* to return a drive on the computer to full functionality.

To restore a single drive using the recovery environment

1. Boot the computer into the Symantec Recovery Disk main window.
   See "I cannot boot the computer from the CD" on page 121.
   Drive letters under the recovery environment may not match those in the Windows environment.
2. Click **Advanced Recovery Tasks**.
3. Click **Restore system or data drives**.
4. Click **Restore drives**.
5. Click **Next**.
6. In the Restore Type window, click **Single drive**.
7. Click **Next**.
8. In the Backup image to Restore window, do one of the following:
   - In the Backup image folder and filename text box, type the location of the backup image file you want to restore.
   - Click **Browse** and navigate to the backup image file you want to restore that resides on your computer.
   - Click **Browse** and in the Filename text box, type the name of the computer and share that holds your backup images on the network

(syntax example: **\\computer_name\share_name**), then press **Enter**. Select a backup image file you want to restore, then click **Open** to add it to the text field.

In the System Restore Wizard, click **Next**. In the Connect As window, type a domain or computer name, user name, and password, then click **OK** to return to the wizard.

If you are still unable to see your network after typing the computer name and share name, you may need to map a drive to see and browse the network.

See "Network connectivity during a restore" on page 125.

9 If the backup image is password-protected, type the password in the Password text box, then click **OK**.

10 Click **Next**.

11 In the Restore Destination window, select the destination where you want to restore the backup image file.

Some of the drives listed may be invalid selections because there is not enough free space for the restored backup image file or because you do not have rights to the drive.

12 If you want to free up disk space, select a drive, then click **Delete Drive**.

This will free space if a single volume space on the hard drive is not adequate.

When you click Delete Drive, the drive is only virtually deleted at that point. The actual deletion of the drive takes place after you click Finish in the wizard. If you change your mind before clicking Finish, go back to the Restore Destination window and click Undo Delete to "restore" the drive.

13 Click **Next**.

14 In the Restore Options window, select or deselect the restore options you want.

The actual options available will depend on the restore location you selected earlier.

- Verify backup image before restore
- Check for file system errors after restore
- Resize drive to fill unallocated space
- Set drive active
- Set partition type
- Restore original disk signature
- Restore MBR

See "Restore options" on page 94.

15 Click **Next**.

16 In the Completing the System Restore Wizard window, review the system restore options you have selected.
If you need to change any options, click **Back**.

17 To reboot the computer automatically after the backup image is restored, select **Reboot after finish**.

18 Click **Finish**.

19 Click **Yes** to begin restoring the backup image.

Restoring drives using the recovery environment

You can use the System Restore Wizard from the recovery environment to restore an entire computer that has more than one drive.

You can also use the recovery environment to perform a *bare metal recovery* of a computer that has suffered a catastrophic hard drive failure.

Restore drives using Symantec Recovery Disk

You can restore multiple drives, add a backup image file, edit the list of backup images, or **remove a filename from the list of backup images.**

To restore multiple drives

1 Boot the computer into the Symantec Recovery Disk main window.
See "I cannot boot the computer from the CD" on page 121.

2 Click **Advanced Recovery Tasks**.

3 Click **Restore system or data drives**.
Drive letters under Symantec Recovery Disk may not match those in the Windows environment.

4 Click **Restore drives**.

5 Click **Next**.

6 Click **Multiple drives**.

7 Click **Next**.

8 In the Backup images to restore window, add, edit, or remove backup image files.
See "To add a backup image file" on page 99.
See "To edit the list of backup images" on page 100.
See "To remove a filename from the list of backup images" on page 100.

9 To reboot the computer automatically after the backup images are restored, select **Reboot after finish**.

10 Click **Finish**.

11 Click **Yes** to start restoring the backup images.

To add a backup image file

1 In the Backup images to restore window, click **Add**.

2 Specify the location of the backup image file.

3 Click **Next**.

4 In the Restore Destination window, select the destination where you want to restore the backup image file.
Some of the drives listed may be invalid selections because there is not enough free space for the restored backup image file or because you do not have rights to the drive.

5 If you want to free up disk space, select a drive, then click **Delete Drive**.
This will free space if a single volume space on the hard drive is not adequate.
When you click Delete Drive, the drive is only virtually deleted at that point. The actual deletion of the drive takes place after you click Finish in the wizard. If you change your mind before clicking Finish, go back to the Restore Destination window and click Undo Delete to “restore” the drive.

6 Click **Next**.

7 In the Restore Options window, select or deselect the restore options you want.
The actual options available will depend on the restore location you selected earlier.

- Verify backup image before restore
- Check for file system errors after restore
- Resize drive to fill unallocated space
- Set drive active
- Set partition type
- Restore original disk signature
- Restore MBR

See “Restore options” on page 94.

To edit the list of backup images

1. In the Backup images to restore window, select a filename from the list of backup images you are restoring.
2. Click **Change**.
3. Do one of the following:
   - Specify a new path to the backup image
   - Select a new backup image filename
   - Select a new restore destination
   - Select new restore options

To remove a filename from the list of backup images

1. In the Backup images to restore window, select a backup image filename.
2. Click **Remove**.

Restoring drives using a system index file in the recovery environment

You can use the System Restore Wizard from the *Symantec Recovery Disk* to restore an entire computer that may have more than one drive. This type of restore uses a system index file (*.sv2i*) to reduce the amount of time needed to restore the drives. Each time a backup image is created, a system index file is saved along with it. The system index file contains a list of the most recent backup image files, including the original drive location of each backup image file.

If you have suffered a catastrophic hard drive failure, you can also use Symantec Recovery Disk to perform a *bare metal recovery* of a computer.

To restore multiple drives using a system index file

1. Boot the computer into the Symantec Recovery Disk main window.
   See "I cannot boot the computer from the CD" on page 121.
   Drive letters under the recovery environment may not match those in the Windows environment.
2. Click **Advanced Recovery Tasks**.
3. Click **Restore system or data drives**.
4. Click **Restore drives**.
5. Click **Next**.

6 In the Restore Type window, click **Multiple drives using system index file (*.sv2i)**.

7 Click **Next**.

8 In the System Index File window, do one of the following:

- Type the full path to the system index file (*.sv2i)
- Click **Browse** to navigate to the system index file.

The system index file is in the same location as the backup image file location.

9 Click **Next**.

10 In the backup Images to Restore window, do one of the following:

- Select the filename of the backup image you want to restore from the list box. By default all backup images are selected.
- Add, edit, or remove backup image files.
  See "To add a backup image file" on page 99.
  See "To edit the list of backup images" on page 100.
  See "To remove a filename from the list of backup images" on page 100.
- To reboot the computer automatically after the backup images are restored, select **Reboot after finish**.

11 Click **Finish**.

12 Click **Yes** to restore the backup images.

Chapter 7

Copying a drive

This chapter includes the following topics:

- About copying a drive
- Preparing to copy drives
- Copying one hard drive to another hard drive

About copying a drive

You can copy the contents of one hard drive to another hard drive when upgrading or adding a hard drive. Using the Copy Drives feature, you can copy your operating system, applications, and data to another hard drive.

If the hard drive you are copying has more than one partition, you must copy the partitions one at a time to another hard drive.

You should not use the Copy Drives feature to set up a hard drive that will be used in another computer.

To copy one hard drive to other computers with identical hardware, create a backup image of the hard drive in the computer you want, then restore the backup image onto other computers whose hardware is identical.

Note: This feature may not be available in your version of the product. To upgrade to a version that supports this feature, visit sea.symantec.com.

Preparing to copy drives

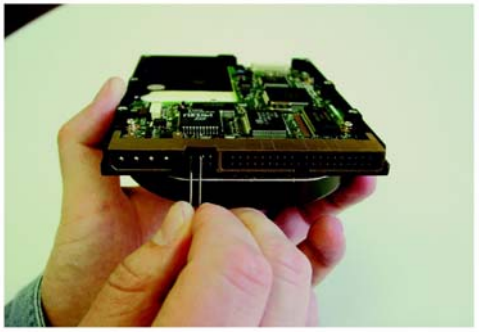
Before you can copy drives, you must correctly add and configure another hard drive.

To prepare to copy drives

1 Do all of the following:

- Prepare the computer.
- Get the manufacturer's directions for installing the drive.
- Shut down the computer, and disconnect the power cord.
- Discharge electricity by touching a grounded metal object.
- Remove the computer cover.

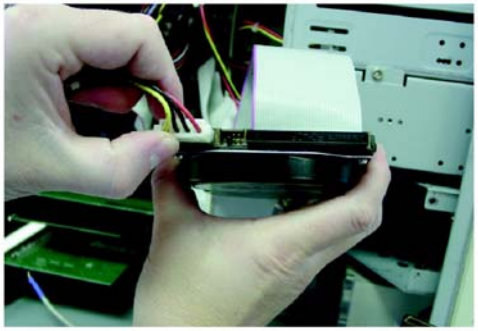
2 Change the hard drive jumper settings to make the new hard drive the slave drive, or connect it as the slave drive if you are using cable select instead of jumper settings to determine the master and slave drives.



3 Attach the new hard drive by doing the following:

- Connect the cable so the colored stripe on the edge lines up with the I/O pins on the motherboard.
  The motherboard is marked Pin1 or 1 where the colored stripe should go.
- Connect the other end of the cable to the back of the hard drive, again matching the striped edge with the I/O pin position on the drive itself.
  The I/O pin is usually on the side closest to the power supply.

4 Attach the power connector to the new hard drive.
There is only one way to connect the power cable—don't force it. Make sure the angled edge of the plastic connector lines up with the angled edge of the pin socket.



5 Anchor the drive in the bay area according to the manufacturer's instructions for the computer or the computer bay requirements.

6 Change the BIOS settings to recognize the new hard drive:

- Watch the bottom of the screen while your computer is booting up, and press **Del**, **F1**, **F2**, or **F10** according to the legend that appears.
- Select **Auto Detect** for both the master and slave drives.
- Save the BIOS changes and exit.
  Your computer will reboot automatically.

Copying one hard drive to another hard drive

When you have your new hard drive installed, you are ready to copy your old hard drive to the new one. The new hard drive does not need to be formatted.

If the hard drive you are copying contains more than one partition (for example, a C:\ drive, a D:\drive, an E:\ drive, and so forth), you must copy each partition, one at a time, to the new hard drive.

If the power or other hardware fail when you are copying data, no data is lost from the source drive. Should the power or other hardware fail, just start the process again after the failure is resolved.

Note: This feature may not be available in your version of the product. To upgrade to a version that supports this feature, visit sea.symantec.com.

Drive-to-drive copying options

When you copy a drive from one hard drive to another, you can use the drive-to-drive copying options.

Table 7-1 describes the drive-to-drive copying options.

Table 7-1 Drive-to-drive copying options

Option	Description
Check source for file system errors	Checks the source (original) drive for errors *before* copying it.
Check destination for file system errors	Check the destination (new) drive for errors *after* copying the drive.
Resize drive to fill unallocated space	Automatically expands the drive to occupy the destination drive's remaining unallocated space.
Set drive active (for booting OS)	Make the destination drive the active partition (the drive the computer boots from). Only one drive can be active at a time. To boot the computer, it must be on the first drive, and it must contain an operating system. When the computer boots, it reads the partition table of the first drive to find out which drive is active and boots from that location. If the drive is not bootable or you are not certain that it is, have a Windows boot disk ready. This option is valid for *basic disks* only (not *dynamic disks*).
Disable SmartSector copying	Symantec's SmartSector® technology speeds up the copying process by only copying clusters and sectors that contain data. However, in some cases, such as high-security environments, it may be desirable to copy all clusters and sectors in their original layout, whether or not they contain data. To copy both used and unused sectors, click this option. Selecting Disable SmartSector copying increases copying time.
Ignore bad sectors during copy	Copies the drive, even if there are errors on the disk.
Destination partition type	Lets you set the partition type to one of the following: ■ Primary partition ■ A *logical partition* inside an *extended partition*
Drive letter	Assigns the selected drive letter to the partition.

Table 7-1 Drive-to-drive copying options

Option	Description
Copy MBR	Copies the master boot record from the source drive to the destination drive. The master boot record is contained in the first sector of the first physical hard drive. The MBR consists of a master boot program and a partition table that describes the disk partitions. The master boot program looks at the partition table to see which primary partition is active. It then starts the boot program from the boot sector of the active partition. Select this option if you are copying the C:\ drive to a new, empty hard drive. Additionally, if you are copying multiple drives to a new, empty hard drive, you only need to select this option once. You should **not** select this option if you are copying a drive to another space on the same hard drive as a backup or if you are copying the drive to a hard drive with existing partitions that you will not be replacing.

To copy from one hard drive to another hard drive

1 From the advanced view, click **Tools** > **Copy Drive**.

2 Complete the wizard to copy the drive.
The wizard will guide you through selecting the right drive to copy, the destination drive, and the options for copying the data from one drive to another.

Appendix A

Troubleshooting

This chapter includes the following topics:

- Troubleshooting the product
- Error messages

Troubleshooting the product

Use the troubleshooting information to find solutions to problems that might occur in using the product.

For additional troubleshooting information, see the Readme.txt file on the product CD or refer to the Symantec website.

- Installation
- Backup image
- Scheduled backup image
- Restore backup images from Windows
- Console
- Recovery environment
- Deploying the agent
- Getting help for volumes on Windows

Installation

This section presents solutions for the following problems:

- I cannot find a remote server that I want to add to the console
- I installed the agent, but when I performed a restore, I was prompted to insert the product CD and boot into Symantec Recovery Disk. Why?
- I do not know the system information that I am required to enter
- Drive letter changes

I cannot find a remote server that I want to add to the console

Have you installed the agent on the remote computer? If you have, check to make sure that the remote server is not down or disconnected from the network. Also, make sure you are using the correct computer name. You may also want to try connecting using the IP address of the remote computer.

I installed the agent, but when I performed a restore, I was prompted to insert the product CD and boot into Symantec Recovery Disk. Why?

Symantec Recovery Disk is not part of the agent installation and therefore, it is not installed on the hard disk. If the server volume that you are restoring cannot be locked ("drive lock") you will be prompted to insert the product CD so you can manually boot directly into Symantec Recovery Disk from the CD and continue with the restoration.

I do not know the system information that I am required to enter

You can get a list of information about your system directly from Windows. You can use this information to specify an IP address, drivers, and so forth when installing the Symantec product or setting up Symantec Recovery Disk.

To get system information from Windows

1. On the Windows taskbar, click **Programs** > **Accessories** > **System Tools** > **System Information**.
2. Use the tree pane area to select the information group you want to view or print.

Drive letter changes

If the drive letter of the CD drive has changed since you installed the product, when you run the “Repair” or “Modify” installation option from the product CD you will get an error message indicating that the MSI file cannot be found. This error typically occurs if you are adding or removing external devices to a desktop PC or internal devices to a laptop.

To avoid this issue, make sure that Windows “sees” the CD drive as the same drive letter as when the product was first installed.

Backup image

Check here for suggestions to help resolve problems that are encountered while creating backup images.

- Backup image on CD
- Support for CD/DVD burners
- DVD-ROM drives

Backup image on CD

- Difficulties with creating backup images to CD may be resolved by downloading the latest CD or DVD drivers and firmware updates from the manufacturer of your CD or DVD writer.
  When you have completed the update, shut down the computer. To ensure the computer recognizes the drive
  - If your CD/DVD burner is internal, turn off the power to the computer, then turn the power back on.
  - If your CD/DVD burner is external, unplug the power source to the burner, then plug it back in.
- If you create a backup image of two drives and the first backup image fills one and a half CDs, you will be prompted to insert new media before the second drive is backed up. It helps to think of the two drives as two separate backup sets. This process makes it easier to restore backup images from removable media later.

Support for CD/DVD burners

Supported burners allow variable packet writing, a necessary feature if you are writing a backup image to CD or DVD. Most burners manufactured since 1998 support variable packet writing.

To see if the product supports your CD or DVD writer, please visit www.gearsoftware.com/support/recorders/index.cfm#L. Specify your OS and the manufacturer of your CD or DVD writer to see if your device is supported.

If your burner is not listed, you should check your burner's documentation to see if variable packet writing is supported before you attempt to write backup images to it.

DVD-ROM drives

Some DVD-ROM drives cannot play DVD+R media. If you plan to create a backup on DVD+R media and later restore from a DVD-ROM drive, you should check the drive compatibility list at http://www.gearsoftware.com/support/recorders/index.cfm#L.

Scheduled backup image

Check here for suggestions to help resolve problems that are encountered while scheduling backup jobs.

- I created a backup job and set a number of full backups that I wanted to maintain on the hard disk. After a while, backups stopped being created
- Checking the status of the agent
- I deleted a drive and now I get backup job errors

I created a backup job and set a number of full backups that I wanted to maintain on the hard disk. After a while, backups stopped being created

When you create a backup job, you can specify the number of backup images you want to save on the hard disk before they are rotated out and deleted. When you use this option you must also make sure that you have enough hard disk space to accommodate the number of backup images you specify, plus one additional backup image. If you run out of hard disk space before the number of specified backup images is reached, the recurring backup image process will no longer function and a current backup image will not be created. The solution is to either reduce the number of recurring backup images you are creating, increase the amount of space necessary to maintain the number of backup images you specify, or simply delete the schedule, then recreate a new one.

See “Viewing events in the product” on page 34.

Checking the status of the agent

You can check the status of the agent to ensure it is started and ready. If backup images are not being created, it may be because the agent has stopped.

To check the status of the agent

1. From the Services window, under the Name column, select **Symantec LiveState Recovery**.
   See "Opening Services" on page 143.
   The Status column for Symantec LiveState Recovery should have "Started" listed.
2. To stop the service, right-click **Symantec LiveState Recovery**, then click **Stop**.
   To start the service, right-click **Symantec LiveState Recovery**, then click **Start**.

See "Managing the agent using Windows Services" on page 141.

I deleted a drive and now I get backup job errors

If you delete a drive, you should also delete any backup jobs associated with that drive. Otherwise, the backup jobs will attempt to run on the deleted drive, resulting in errors every time.

Restore backup images from Windows

Check here for suggestions to help resolve problems that are encountered while restoring backup images from Windows.

- Restoring from a backup image that is spanned
- Restoring a system drive
- I cancelled a restore. The volume disappeared from the volume list in the console. I restored the volume again to the same destination but the volume did not show up in the volume list

Restoring from a backup image that is spanned

When you restore a system drive under Windows from the console and the backup image is on spanned CDs, the console will not prompt correctly for the next media. To avoid this problem, restore the backup manually using the System Restore Wizard in the recovery environment.

When you are restoring from CD, you are prompted to insert the first CD, followed by the last CD, the first CD, the last CD, then the first CD again. Then

the restore begins and prompts you for the media in sequence. After restoring a backup image, you will be prompted again to insert the first CD one more time.

For example, if you had a backup image that spanned across five CDs, the order you would insert the CDs would be as follows: 1-5-1-5-1-2-3-4-5-1.

See "Dividing a backup image file into smaller files" on page 56.

Restoring a system drive

If you began restoring a backup of a system drive under Windows and encountered an error, you will need to boot into the recovery environment and start the System Restore Wizard to manually restore the backup.

When you restore a system drive that requires booting into the recovery environment, the restore may not complete automatically if the recovery environment assigns different letters to drives other than what was assigned under Windows. This discrepancy is sometimes caused by USB and FireWire devices or CD devices, or if you have manually changed drive letter assignments. (Under Windows, fixed drives are assigned first; under the recovery environment, removable drives are assigned first.) The work-around is to restore the backup manually from the recovery environment using the System Restore Wizard.

See "Restoring drives using the recovery environment" on page 98.

I cancelled a restore. The volume disappeared from the volume list in the console. I restored the volume again to the same destination but the volume did not show up in the volume list

When you cancel in the middle of a restore, in most cases, the destination partition is already created (or deleted if it was pre-existing), but a drive letter has not been assigned to the partition. Because a drive letter has not yet been assigned, the volume will not be displayed in either the console or Windows Explorer.

The product is designed to keep drive letter assignments of volumes intact when you restore a backup image over it. This also includes not assigning a drive letter if the destination volume did not have a drive letter to begin with, when you restore a backup image.

At the time you cancelled the restoration, the volume did not yet have the drive letter assigned to it. As a result, when you successfully restored the entire backup image to the same destination a second time, the product noticed that the volume did not have a drive letter assignment, and therefore kept that assignment intact. A volume with no drive letter will not show up in the console

or Windows Explorer; your backup image contents, however, will be completely restored.

You can easily fix this display issue by manually assigning a drive letter to the volume using a tool such as Microsoft's Disk Management console.

Console

This section presents solutions for the following problems:

- I cannot connect to a server that has the agent installed
- I cannot add my server. I get an error that the class is not registered.
- How do I create a backup directly to tape?
- How do I break up an existing backup image file into a spanned file set?
- How can I test the scheduling feature without actually creating a backup schedule?
- Sending email notifications anonymously

I cannot connect to a server that has the agent installed

If you cannot connect to a server that has the agent installed on it, on that server check the product's Security Configuration Tool to ensure the user you are running the console as is listed or is a member of a group that is listed. Only users or groups listed in this Security Configuration Tool have the ability to connect to the agent on that computer. Also, check the Windows Event Viewer on the server to ensure that the agent service started successfully.

See "Controlling access to the agent (or console)" on page 146.

I cannot add my server. I get an error that the class is not registered.

Check to make sure that the Symantec LiveState Recovery agent is installed. If it is installed, check inside the Microsoft Services console (SERVICES.MSC) to ensure that the service is started. Also, check the Event tab in the console for any errors.

See "Viewing events in the product" on page 34.

How do I create a backup directly to tape?

Symantec LiveState Recovery does not write backup image files directly to tape. However, you can create a backup image and save it to the network. You can then transfer the backup image file to a tape drive or burn it to CD or DVD. To

restore the backup image from tape, you must copy the files back to a local or network drive before restoring.

How do I break up an existing backup image file into a spanned file set?

You can use the Export Backup Image feature in Backup Image Browser.

See "Exporting a backup image" on page 75.

When you export a backup image, you can select the option "Divide the backup image into smaller files for archiving". For example, if you plan to copy a backup image to CD, specify a file size of 700 or less.

How can I test the scheduling feature without actually creating a backup schedule?

To test the scheduling of backup images, stop the Symantec LiveState Recovery agent in the Microsoft Services console. Then change the date forward on the server to a time when you would like the scheduled backup image to occur, then restart the Symantec LiveState Recovery agent. If the date on the server is changed while the Symantec LiveState Recovery agent is running, the change will not be noticed by the agent.

Note: If you add a new partition to the hard drive, it may take several seconds before the new partition appears in the Symantec LiveState Recovery console.

Sending email notifications anonymously

If you have set up e-mail notification in Options (Tools > Options) of the Symantec LiveState Recovery console and you do not want to use NTLM (NT LanMan) to authenticate with the SMTP server, you will need to set the "Anonymous" property in the Notification system's configuration file.

See "Setting notifications" on page 36.

To send email notifications anonymously

1. From the Symantec LiveState Recovery install folder (the default path is \Program Files\Symantec\Symantec LiveState Recovery\Agent), open Symantec LiveState Recovery.Notify.xml in a text-editing application such as Notepad.
2. Locate the following property in the file:

```
<Anonymous vt="11">0</Anonymous>
```

3 Set the value to **1** to use anonymous connections to the SMTP server.
Any e-mail notification is sent to the SMTP server without attempting authentication.
Or, set the value to **0** (default) to use NTLM with the credentials of the Symantec LiveState Recovery service. Any e-mail notification is sent to the SMTP server using NTLM authentication.

4 Save Symantec LiveState Recovery.Notify.xml.

5 Restart the **LiveState Recovery** agent.
See "Starting, stopping, or restarting the agent service" on page 143.

Recovery environment

Use the following information to help you perform restorations from Symantec Recovery Disk (the recovery environment) or to solve issues you may experience while restoring a backup image from Symantec Recovery Disk.

- How does Symantec Recovery Disk work?
- Using the support utilities
- I cannot boot the computer from the CD
- I cannot access (or see) the local drive where my backups are saved
- I cannot access the network drive where my backups are saved
- Supported storage devices and NIC drivers
- My backup is on CD but I cannot use the drive because the product CD is running the recovery environment
- I am using the recovery environment to restore but I cannot browse to where my backup images are located.
- Running USB devices
- Using pcAnywhere Thin Host for a remote recovery
- Network connectivity during a restore
- Editing the boot.ini file
- Getting a static IP address
- Server clusters and restoring
- Workgroups and restoring
- Using a delayed apply with no DHCP
- Restoring within a workgroup environment
- Restoring a DHCP server

How does Symantec Recovery Disk work?

The Symantec LiveState Recovery product CD is used both to install the product and to boot a computer into the recovery environment, known as Symantec Recovery Disk. Be sure you store the CD in a safe place.

Symantec Recovery Disk makes restoring backup images possible under almost any computer disaster. Occasionally, a computer failure can leave the operating system intact but prevent you from restoring a backup image after rebooting. Or, a computer failure can leave the operating system inoperative, making a restoration seem impossible. For these types of situations, you can restore a backup image using Symantec Recovery Disk.

In the recovery environment, you can run, among other tools, the System Restore Wizard (to restore a backup image) or Backup Image Browser (to perform a file-level restore).

After restoring a backup image, you can reboot the computer into its previous, usable state.

See "Booting a computer into the recovery environment" on page 45.

Using the support utilities

When you are running under the recovery environment, there are several support utilities available (under Advanced Recovery Tasks) that you can run to troubleshoot networking or hardware issues you may encounter. For example, you can ping a computer, renew IP addresses, or get information about a hard drive partition table.

Symantec Technical Support may require information generated by these utilities, if you call Symantec for help resolving problems.

Table A-1 describes the support utilities available in the recovery environment.

Table A-1 Support utilities

Support utility	Description
Start Networking Services	Use to load the necessary network drivers on your computer so you can access network-stored backup image files.
Start pcAnywhere Thin Host	Use to start pcAnywhere Thin Host to establish a remote control session for use by a remote computer using Symantec pcAnywhere. When selected, starts Networking services, if necessary. See "Using pcAnywhere Thin Host for a remote recovery" on page 123.

Table A-1 Support utilities

Support utility	Description
Map Network Drive	Use to map a network drive. See "Network connectivity during a restore" on page 125.
Configure IP Address	Use to configure network addresses for a network card. See "Getting a static IP address" on page 126.
Run IPConfig Utility	Use the IPConfig utility to view, among other things, network adapter information. You can also release or renew IP addresses from this utility. You can save the information to a text file (ipconfig.txt) which can then be sent to technical support, if necessary.
Ping Remote Computer	Use to see if the remote computer (where the backup image file is located) is available and network connections to that computer are intact and functioning. Type the IP address of the computer you want to check, then click OK.
Set Network Card Speed	Use to automatically set the Network Interface Card (NIC) on the computer to the highest speed possible. If you want to restore a backup image that is stored on a network, you can run this utility (while network services are running) prior to restoring the image. This will ensure maximum throughput of the image across the network.
Edit boot.ini	Use to edit the boot.ini directly from the recovery environment. See "Editing the boot.ini file" on page 125.
Restore Legacy Ghost Image	Use to restore a .gho image file created with Symantec Ghost 8.0.
Display SME Disk Information	Use to view, among other things, information about the hard drive on the computer. You can save the information to a text file (smedump.txt) which can then be sent to technical support, if necessary.
View Partition Information	Use to create a report of the contents of your hard drive partition table. This report can help you diagnose and fix various disk partition problems. You can save the information to a text file, which can then be sent to technical support, if necessary.

Table A-1 Support utilities

Support utility	Description
Edit Partition Table	Use to read and allow manipulation of the partition table information found in the Master Boot Record and EPBR Boot record. This utility is useful for fixing partition table errors or boot sector problems. You can make changes to partition tables by using decimal values rather than hex values. You can also change the file system flag, set the active partition, hide and unhide partitions, and change CHS values, boot sector information, and the number of sectors in a partition. When you change the number of sectors, the final result must match the CHS values. This utility looks at partition table information in a relative fashion. Basically, it finds the start sector of a primary partition by calculating the absolute value of the sector from the start of the drive to the boot sector of the partition. **Note:** This utility should only be used under the guidance of Symantec technical support.
Change Active Partition	Use to easily and quickly switch between bootable primary partitions. This utility is for users who only occasionally need to change the active partition. Type the ID number of the partition (shown in the first column) you want to make the bootable primary partition, then press Enter. This utility makes the partition active and reboots the computer.
Restore Master Boot Record	Use to save or restore critical MBR (Master Boot Record) information in the first sector of a hard drive. The contents of the first sector or entire first head of the hard drive are saved or restored to a file.

To use the support utilities

1. In the recovery environment main window, click **Advanced Recovery Tasks**.
2. **Click Run utilities**.
3. Click the support utility that you want to run.

See "Booting a computer into the recovery environment" on page 45.

I cannot boot the computer from the CD

To run Symantec Recovery Disk, you must be able to boot your computer from the product CD.

To boot from the product CD

1. Turn on your computer.
2. While the computer is booting, watch the bottom of the screen for a prompt that tells you how to access the BIOS.
   Generally, you'll need to press **Del**, **F1**, **F2**, or **F10**.
3. From the BIOS screen, choose the **Boot** menu.
   The boot devices will be listed.
4. Change the CD or DVD drive to be the first boot device in the list.
5. Save the changes and exit the BIOS setup.
   When you boot your computer with the product CD in the drive, you will see a prompt telling you to press any key to boot from CD. If you do not press a key, your computer will attempt to boot from the next boot devices listed in the BIOS. There is only a short delay when the prompt to press a key is displayed, so you need to watch carefully as the computer boots.
6. Press a key, and the recovery environment (Symantec Recovery Disk) starts.

See "Booting a computer into the recovery environment" on page 45.

I cannot access (or see) the local drive where my backups are saved

You may need to load drivers for the storage device where your backups are saved as part of booting to the recovery environment.

To load drivers for storage devices

1. Insert the product CD, and restart your computer.
2. To add storage drivers for most SCSI devices, when you see the prompt "Press any key to boot from CD", press **F6**.
   If you press a different key, you will not have an opportunity to load special drivers.
3. Press **S** when prompted to specify additional SCSI adapters, CD drives, or special controllers for use with Windows, including those for which you have a device support disk from a mass storage device manufacturer.

If you do not have the drivers available from the device manufacturer and they are not included as part of Symantec Recovery Disk, you will not be able to use that drive.

I cannot access the network drive where my backups are saved

The system where you are running the recovery environment may use a NIC driver that is not included as part of the recovery environment.

Please contact Symantec Technical Support, if your NIC is not detected by the recovery environment.

Supported storage devices and NIC drivers

Driver Validation checks for network and storage devices on the computer to see if there are drivers for using the devices when using Symantec Recovery Disk.

See "About Driver Validation" on page 43.

If your storage device is not listed, you can press F6 when booting a computer into the recovery environment and manually load the necessary drivers.

If your NIC card is not listed and the recovery environment does not detect the driver, contact technical support.

My backup is on CD but I cannot use the drive because the product CD is running the recovery environment

When you restore a backup from a CD or DVD from within the recovery environment and you only have one CD or DVD drive, you must leave the product CD in that drive until *after* you have clicked Browse to locate the backup. After the Open dialog box has displayed, you can remove the product CD and insert the media that contains the backup.

If you remove the product CD before clicking Browse, the recovery environment will exit back to the recovery environment main window.

I am using the recovery environment to restore but I cannot browse to where my backup images are located.

If you click Browse and cannot see or browse the network from the Open dialog, try the following procedure.

To find your network

1 In the File name box, type the name of the server and share that holds your backup images.

For example: **\\server_name\share_name**

2 Press **Enter**.

3 Select a backup image file, then click **Open** to add it to the Image file text box.

If you are still unable to see your network after typing the server name and share name, you may need to map a drive and log on as a different user to see and browse the network.

See "Network connectivity during a restore" on page 125.

Running USB devices

To enable a USB device while you are running the recovery environment, you must first attach the device, then reboot the computer into the recovery environment.

Using pcAnywhere Thin Host for a remote recovery

Using the Symantec Recovery Disk, you can host a remote control session by starting pcAnywhere Thin Host. Once started, the thin host waits for a connection that can be used to remotely manage a recovery or perform other tasks in the recovery environment.

To connect to the thin host, you must use Symantec pcAnywhere on a remote computer.

The pcAnywhere Thin Host contains the minimum settings needed to support a single-use remote control session. The thin host requires an IP address for hosting a remote control session.

Note: A thin host cannot be deployed to the recovery environment. The thin host can only be started from Symantec Recovery Disk to host a remote control session. The thin host in Symantec Recovery Disk does not support file transfers and cannot be used to add drivers for network or storage devices.

To start pcAnywhere Thin Host

1 In the recovery environment main window, click **Advanced Recovery Tasks**.

2 **Click Run utilities.**

3 Click **Start pcAnywhere Thin Host**.
If not started, the Networking services are started.
The thin host establishes a connection.

Remotely connecting to the waiting thin host

Symantec pcAnywhere can be used on a computer to remotely connect to a computer that has already booted into the recovery environment and started the pcAnywhere Thin Host. Once connected, the client computer can remotely manage a recovery or perform other tasks supported in the recovery environment.

Note: The client computer cannot transfer files or add additional drivers for network or storage devices on the computer running the thin host.

To remotely connect to the thin host

1. Ensure that the computer to be remotely managed (the host) has been booted into Symantec Recovery Disk and that pcAnywhere Thin Host has been started and is waiting.
2. Obtain the IP address of the thin host computer.
3. On the client computer, in Symantec pcAnywhere, use the Remote Setup Wizard to configure the remote control session.
   - Specify a TCP/IP connection type.
   - Specify the IP address of the host computer.
   - Choose to automatically login to the host on connection.
   - Specify the following login name:
     symantec
   - Specify the following password:
     recover

   Note: The thin host shuts down when there is an attempt to connect using any incorrect configuration settings.

   The thin host does not support encryption.

   To prevent unauthorized users from tampering with your settings or launching a session without your permission, set a password for your remote connection item using the Protect Item properties page in Symantec pcAnywhere.
4. Start the remote control session.
   If the connection attempt is unsuccessful, the thin host must be restarted on the host computer before making another attempt to connect.
5. Remotely perform necessary tasks on the host computer.

The remote control session ends when the thin host is closed, the thin host computer is rebooted, or when the remote control session is ended.

Note: After the host computer has booted into the Windows operating system, the client computer can deploy and connect a thin host on the computer to verify the success of tasks that were performed while using the recovery environment.

Network connectivity during a restore

The following information applies only if you started networking services when you booted into the recovery environment.

If you attempt to boot directly into the recovery environment when there is no DHCP server (or the DHCP server is down), you will be prompted to enter a static IP address and a subnet mask address for the computer on which you are running Symantec Recovery Disk.

After the static IP address and subnet mask address are correctly entered, you will be able to enter the recovery environment. However, because there is no way to resolve computer names, when you run the System Restore Wizard or Backup Image Browser, you will only be able to browse the network using IP addresses to locate a backup image file. To resolve this issue, you can map a network drive.

To map a network drive

1. In the recovery environment main window, click **Advanced Recovery Tasks**.
2. Click **Run utilities**.
3. Click **Map Network Drive**.
4. Map a network drive using a UNC path of the computer where the backup image file is located.
   For example: **\\computer_name\share_name** or **\\IP_address\share_name**

You will now be able to browse to that drive mapping and select a backup image file that you want to restore.

Editing the boot.ini file

If necessary, you can edit the boot.ini directly from the recovery environment. The boot.ini is a Microsoft initialization file that is found at the root directory of your primary boot partition (usually the C:\ partition). The file is used by Microsoft Windows to display a menu of operating systems that are currently installed on a computer. You can then select which operating system to boot.

The boot.ini is also used to point to the locations of each operating system on the computer.

For more information about editing the boot.ini file under a particular Windows operating system, refer to the following Microsoft Knowledge Base article IDs on microsoft.com:

- 289022 (for Windows XP)
- 311578 (for Windows 2000)

To edit the boot.ini file

1. In the recovery environment main window, click **Advanced Recovery Tasks**.
2. Click **Run utilities**.
3. Click **Edit Boot.ini File** to open the file in a plain text editor.
4. Make the changes you want and save the file.

Getting a static IP address

If you are trying to restore a backup image that is located on a network drive/share, but you are unable to map a drive or browse to the drive/share on the network (usually caused by the lack of an available DHCP service), you can assign a unique static IP address to the computer that is running the recovery environment. You can then map to the network drive/share.

The Network Configuration dialog is automatically displayed if there is no DHCP service available when you start the recovery environment. However, if it does not display you can open it from the recovery environment.

To get a static IP address

You can display the Network Configuration window, get a static IP address, **get an IP address if the ping is unsuccessful, and map a network drive.**

To display the Network Configuration window

1. In the recovery environment main window, click **Advanced Recovery Tasks**.
2. Click **Run utilities** > **Network Configuration**.

To get a static IP address

1. In the list box of the Network Configuration window, select **IP #1**.
2. Click **Modify**.
3. Specify a unique IP address and subnet mask for the computer you are restoring.

Be sure that the subnet mask matches the subnet mask of the network segment.

4 Click **OK** twice to return to the recovery environment main menu.

5 Click **Advanced Recovery Task**.

6 Click **Run utilities** > **Ping Remote Computer**.

7 Specify the address of a computer you want to ping on the network segment using one of the following address methods. (Usually it will be the computer that holds the backup image you are wanting to restore.)

Computer name	Specify a computer name if you use the domain or workgroup to resolve computer names. For example, `computersb`
Computer name and domain	Specify a computer name and domain if you are using an Active Directory domain to resolve computer names. For example, `computersb.domain.com`
IP address	Specify an IP address if there is no computer name resolution available on the segment. For example, `12.345.67.890`

8 Click **OK**.
If you specified a computer name or computer name and domain as the address method, make note of the IP address that is returned from the computer you are pinging.
See "Getting a static IP address" on page 126.
If communication to the storage computer is operating as expected, you can use the Map Network Drive utility to map a drive to the backup image location.

To get an IP address if the ping is unsuccessful

1 On the computer that holds the backup image you are wanting to restore, at a DOS prompt, type **ipconfig /all** and press **Enter**.

2 Write down the IP address that is displayed.

3 Return to the computer that is running the recovery environment and run the utility **Ping Remote Computer** using the IP address you wrote down.

To map a network drive

1 In the recovery environment main window, click **Advanced Recovery Tasks.**

2 Click **Run utilities** > **Map Network Drive**.

3 In the Drive drop-down list, select a drive letter.

4 In the Folder text box, type the IP address of the storage computer and the share where the backup image is located.
For example: `\\IP_address\share_name\`

5 Click **Connect using a different user name**.

6 In the User name box, type the IP address and username.
For example: `IP_address\user_name`

7 In the Password text box, type the username password.

8 Click **OK**.

You should now have a drive mapped to the backup image location on the storage computer.

Server clusters and restoring

When you are working with a server cluster, none of the servers' shared hard drives can be online during a restore from the recovery environment. Therefore, when you need to restore a volume to a computer that is part of the cluster, make sure that all other servers in the cluster have exclusive rights to the shared storage; take all shared hard drives in the cluster offline, then perform the restore using the System Restore Wizard.

Workgroups and restoring

To mount computers located in other workgroups or domains while running under Symantec Recovery Disk, you must already have "WORKGROUP" present on the network and it must already be authenticated to the domain by mapping the drive so the WORKGROUP server is able to share across the network.

Using a delayed apply with no DHCP

If there is no DHCP service available and you have stored your backup images to a network drive, a *delayed apply* will not work because the computer name cannot be resolved to the IP address.

To work around this issue, you can boot directly into the recovery environment and restore the backup image from there using a static IP address.

Restoring within a workgroup environment

When you use the product in a workgroup environment (such as a small office/ home office) that is not part of a network domain, you will typically not have a DHCP, DNS, or WINS service to manage the assignment of dynamic IP

addresses. Instead, you would most likely have a static IP address assigned to each computer. Not having a dynamic IP address is not a problem when you want to restore a backup image while running under the recovery environment.

For example, suppose you have a small office workgroup environment with two computers. You would make sure that both computers have the same login username and password. When you want to restore computer 1 using a backup image that is stored on computer 2, you boot into Symantec Recovery Disk on computer 1, map a network drive to computer 2, then browse to the backup image file (or a file within the backup image if you are using Backup Image Browser) and restore as usual.

If you are using a delayed apply, you will be prompted for the username, password, and domain name. This is because computer 1 is trying to authenticate to computer 2 where the backup image is stored. You will need to enter the *workgroup name* for the domain name or IP address for computer 2.

Restoring a DHCP server

You cannot restore a DHCP server from a backup image that is stored on the network. This is because the recovery environment must get an IP address from the DHCP server. If the computer you are restoring is the DHCP server from which the recovery environment is trying to get a dynamic IP address, the task will be unsuccessful.

Specify a static IP address manually.

Deploying the agent

These errors may display in the pushlog.txt file or in the product interface.

- Attempt to connect to remote computer failed
- Attempt to copy RemoteCmdSvc.exe to remote computer failed
- Attempt to access the remote Service Manager failed
- Attempt to create the RemoteCommand Service on remote computer failed
- Attempt to start service on remote computer failed
- Attempted connection to RemoteCmdSvc on remote computer failed
- Attempt to push package to remote computer failed due to an invalid environment
- Attempt to copy package failed
- Attempt to communicate with RemoteCommand Service on remote computer failed

- The specified remote command failed to start
- Attempt to reboot remote computer failed
- Attempt to delete package failed
- The RPC server is unavailable

Attempt to connect to remote computer failed

The product was unable to establish a network connection to the requested computer. This error is usually reported when the current user does not have administrative privileges on the remote computer. This error may also occur if network communication problems exist.

Attempt to copy RemoteCmdSvc.exe to remote computer failed

The product was unable to copy the remote service executable (RemoteCmdSvc.exe) to its destination on the remote computer. This error is usually reported when the product cannot find the RemoteCmdSvc.exe source or was unable to write to the destination computer's Admin$\temp directory.

Attempt to access the remote Service Manager failed

The product was unable to connect to the Service Control Manager on the remote computer. This error is usually reported when the current user does not have administrative privileges on the remote computer. This error may also occur if network communication problems exist.

Verify that the current user has appropriate administrator privileges on the remote computer.

Attempt to create the RemoteCommand Service on remote computer failed

The product was unable to connect to the RemoteCmdSvc service on the remote computer. This error is usually reported when the RemoteCmdSvc is already running on the remote computer.

To correct the problem, either restart the remote computer, or manually stop and remove the RemoteCmdSvc service from the remote computer.

Attempt to start service on remote computer failed

The product was unable to start the RemoteCmdSvc service on the remote computer. This error is usually reported when the RemoteCmdSvc is already running on the remote computer.

To correct the problem, either restart the remote computer, or manually stop and remove the RemoteCmdSvc service from the remote computer.

Attempted connection to RemoteCmdSvc on remote computer failed

The product was unable to start the RemoteCmdSvc service on the remote computer. This error is usually reported when the RemoteCmdSvc is already running on the remote computer.

To correct the problem, either restart the remote computer, or manually stop and remove the RemoteCmdSvc service from the remote computer.

Attempt to push package to remote computer failed due to an invalid environment

The product was unable to copy the package files to the remote computer. This error will occur under the following circumstances:

- Corrupted package files.
  Correct this problem by reinstalling the product.
- Connection to RemoteCmdSvc service on the remote computer has not been fully established.
  Correct this problem by restarting the remote computer and retrying the operation.

Attempt to copy package failed

The product was unable to copy the package files to the remote computer. This error is usually reported when the package files are left open on the remote computer from a previously failed copy.

Restart the remote computer, and retry the agent deployment.

Attempt to communicate with RemoteCommand Service on remote computer failed

The product was unable to communicate with the RemoteCmdSvc service.

Either restart the remote computer or manually stop and remove the RemoteCmdSvc service from the remote computer.

The specified remote command failed to start

The product was unable to execute the specified remote command. This error will occur when the remote install package encountered an error upon execution.

Either restart the remote computer or manually stop and remove the RemoteCmdSvc service from the remote computer.

Attempt to reboot remote computer failed

The product was unable to force the remote computer to reboot. This error will occur when the current user does not have the SE_SHUTDOWN_NAME privilege enabled or the current user on the remote computer does not have the SE_REMOTE_SHUTDOWN_NAME privilege enabled.

Attempt to delete package failed

The product was unable to fully clean up any package files it copied to the remote computer. This error will occur when a file that is executing quits responding (hangs).

Restart the remote computer.

The RPC server is unavailable

If you add a computer with a computer name that is longer than 14 characters, you must truncate the computer name when you add it to the Symantec LiveState Recovery console.

If truncating the computer name makes it so that computer is no longer unique on the network, you must rename the computer from Windows Properties.

Getting help for volumes on Windows

For more information about basic and dynamic volumes, see the Microsoft Disk Management Help file (DISKMGMT.CHM). The default location for this Microsoft help file is \WINNT\HELP (under Windows 2000 Advanced, 2000, or NT 4), or \WINDOWS\HELP (under Windows 2000 Professional or Windows XP Professional).

Error messages

If the information you need is not included in this section of the documentation, please visit sea.symantec.com for further details.

- Backup Image Browser error messages
- General error messages

Backup Image Browser error messages

Check here for suggestions to help resolve error messages that are encountered while running Backup Image Browser.

- Cannot initialize COM library
- Cannot allocate Symantec LiveState Recovery mount manager instance
- Cannot retrieve drive information
- Cannot dismount drive. Please verify the drive is not locked by another process

Cannot initialize COM library

The product was unable to initialize the COM subsystem. This can be caused by insufficient resources or corrupt DLLs. Reboot the system, and try to free system resources.

Cannot allocate Symantec LiveState Recovery mount manager instance

The product was unable to allocate resources for the Symantec mount manager. This error is usually reported when the product is partially installed or some of the product's COM objects are missing or incorrectly registered.

To correct this condition, reinstall the product.

Cannot retrieve drive information

The Symantec mount manager did not recognize the drive as a mounted backup image. This error is most commonly reported when another process is attempting to dismount the drive. The error may also occur if the drive is corrupt.

Close all disk management programs, and retry the dismount operation. If the problem persists, reboot the computer to allow Windows to re-enumerate all mounted drives.

Cannot dismount drive. Please verify the drive is not locked by another process

The Symantec mount manager was unable to dismount the drive.

To resolve the error, make sure there are no open files on the drive and that the drive is not locked ("*drive lock*") by another application.

General error messages

If you receive an error message you may find the solution here. Otherwise, please visit sea.symantec.com using the generated error code.

- E0710007
- E0B000C
- E0BB001B
- E0BB0097
- E0BC000A
- E7D1001F
- E926001F
- EA390019
- EA39070A
- EA390712
- EBAB001A
- EC8A0001
- EC8F0007
- EC8F000C
- EC950001
- Error: The object invoked has disconnected from its clients
- Catastrophic error
- WinBOM error when booting from recovery environment
- The month and year are flopped on some international computers

E0710007

Cannot create a virtual volume image.

If the error continues, run the recovery environment support utilities Display SME Disk Information and View Partition Information, obtain system information, then contact technical support. Additional log files, such as .txt files from the Agent folder, may also be needed.

See "Using the support utilities" on page 118.

E0B000C

This error may also display one of the following:

- Object BasicDisk SME~Computer~BgM896453 was in the saved state but is not in the current state
- Object MediaCommon:Sme~computer ~Pd1~M896453 was in the saved state but is not in the state

These two error messages could be caused by changes to the serial number. It could also be caused by the drive information reporting differently.

If the restore was initially set up in Windows, but the computer was rebooted into the recovery environment, try going through the System Restore Wizard in the recovery environment rather than going through the restore from the console in Windows. There could be a change in the drive information in Windows 2000 compared to the recovery environment.

If the error continues to occur during the use of the System Restore Wizard from the recovery environment, you should contact technical support.

E0BB001B

Cannot lock volume "\\volume_name" because it contains the operating system or it has an active paging file.

Symantec LiveState Recovery can back up operating system partitions and other partitions containing page files. This error is usually caused by a driver conflict with another application that may have control of the partition.

Check for other applications that may have a lock on the drive and temporarily disable any suspected conflicting drivers, then run Symantec LiveState Recovery again to create the backup image.

E0BB0097

If the error occurs when attempting to restore an image to a partition, delete the partition first. If the error occurs when attempting to create an image of a partition, please contact Symantec technical support.

E0BC000A

The saved initial state for applying changes does not match the current system state.

You should try restoring using Symantec Recovery Disk.

- This error can also be caused by fiber channel devices.
  Disconnect the devices to confirm whether or not they are causing the problem.
- This error may also be caused by Emulex controllers. Occasionally there are phantom volumes or partition table errors that can cause this error.
  Contact Symantec technical support.

E7D1001F

This error can occur if you do not have the correct rights. However, it could also be caused by slow band width, dropped packets, or other network-related issues.

Contact Symantec technical support.

E926001F

Run the Windows chkdsk utility on the source drive before you copy the image or you create a backup image. If this is not possible, and you have confirmed that the backup image file is valid, you can bypass the error by deselecting the restore option Check file system after restore. Once you have finished restoring the image, run chkdsk on the drive to eliminate any file system errors.

EA390019

Insufficient permissions.

Scenario: System A is the Symantec LiveState Recovery console; system B is the Symantec LiveState Recovery agent service, and system C is the share where the backup images are stored.

The user who logs onto system A must have at least local administrator rights on system B if they are creating a backup image. They also need rights to the share location where the backup image is being stored, and will need domain user rights to save to the network.

In a domain, it is suggested that you create one user with Domain Admins and Administrator rights. Use this account to login onto system A. On system B, the Symantec LiveState Recovery agent service should be logging in using the same account. Determining when this error occurs may help identify where permissions are not set correctly.

In a workgroup, it is suggested that you create duplicate accounts (using the same user name and password) on each computer. Make sure that each account has local administrator rights. Log on with this account when managing other agents in the workgroup.

EA39070A

If you are using Veritas DLA you may encounter this error indicating that the internal structure of the v2i file is invalid or unsupported.

Despite this error, the backup image on the disk is still valid. To correct this issue, you can use a regular CD or DVD drive to read the backup image or you can remove Veritas DLA from the computer so the CD can be read properly.

This error can also occur for one of the following reasons:

- If the image file is damaged or corrupted.
  Damage can occur when you create a backup image over a network and there is significant packet loss during the creation of the backup image file. Symantec recommends that you verify images after they are created to ensure their integrity.
  Create a new backup image file to a different location, or create a new image with a different file name to the same location.
- The image file is fine, but there may be a conflict with spyware detection software (such as Pest Control or Spybot) causing the backup image file to become corrupt or appear to be corrupted.
  While using the product or Backup Image Browser, disable all spyware detection software.
- If you copy a backup image file from one FireWire drive to another FireWire drive while connected to a FireWire expansion card that uses a Via chipset (such as the Kouwell card).
  To work around this issue, replace your Via-based FireWire expansion card with a card that uses a non-Via chipset (such as the Adaptec 4300 Fireconnect, which uses a TI chipset).

EA390712

This error is usually caused by insufficient rights to the Symantec LiveState Recovery agent service. A user must have administrator and domain administrator rights on the sub-share folder. Check that the Symantec LiveState Recovery agent services Log On information is correct.

EBAB001A

Cannot read data from drive. An unknown exception has occurred.

This error is reported when you are attempting to save a backup image to a SAN drive or removable media, or when you are attempting to restore a backup image from the recovery environment.

If you are saving a backup image to a SAN drive, check Disk Management for missing or old volumes. If you are saving a backup image to removable media, insert disks into the drive. If that does not work, disconnect the removable media drive and remove any attached USB devices.

If you are using Samba shares be sure you have the basic rights on the Samba. If you are saving the backup image to NAS, check the operating system that is installed; there may be an issue with Linux or with proprietary operating system NAS devices.

EC8A0001

This error is caused by updated firmware on QLogic drives conflicting with the QLogic driver on the product CD. In other cases it could also be caused by any SCSI conflict with particular drivers on the product CD.

Try loading the driver manually.

See "I cannot access (or see) the local drive where my backups are saved" on page 121.

If the error continues, run the recovery environment support utilities Display SME Disk Information and View Partition Information, obtain system information, then contact technical support. Additional log files may also be needed.

See "Using the support utilities" on page 118.

EC8F0007

The error is usually caused by a driver conflict with another application that may have control of the partition. Check for other applications that may have a lock on the drive. Temporarily disable any suspected conflicting drivers and run Symantec LiveState Recovery again.

EC8F000C

Check that the driver is present, and the Symantec LiveState Recovery agent service is started.

EC950001

This error occurs when the driver for the storage controller does not load in Symantec Recovery Disk. Reboot the computer using Symantec Recovery Disk and press F6 to load the necessary drivers.

Error: The object invoked has disconnected from its clients

If you encounter this error the computer (typically a remotely managed computer) has either crashed or the agent service has stopped running.

Catastrophic error

This may be caused by a conflict with another program.

Contact technical support.

WinBOM error when booting from recovery environment

This is an issue with the NIC (Network Interface Card) driver not loading. If the backup image you want to restore is located on the network, you should first try a different NIC card. If that is unsuccessful, you will need to send the drivers and a system information file to technical support.

The month and year are flopped on some international computers

This is an issue with some international servers.

Send the .pqh files to technical support.

Appendix B

Managing the agent

This chapter includes the following topics:

- Managing the agent using Windows Services
- Controlling access to the agent (or console)

Managing the agent using Windows Services

As a Windows service, the Symantec LiveState Recovery agent runs in the background, providing such capability as locally running scheduled backup jobs—even when no one (or an unprivileged user) is logged on to the computer—or allowing administrators to remotely back up servers throughout an enterprise from its centralized console.

See "Using the agent" on page 40.

To use the features of the product, the Symantec LiveState Recovery agent must be started and properly configured. You can use the Windows Services tool to manage and troubleshoot the agent.

Note: To manage the agent, you must be logged on as an administrator.

Using the Services tool, you can manage the agent in the following ways:

- Start, stop, or disable the agent on local and remote computers.
  See "Starting, stopping, or restarting the agent service" on page 143.
- Configure the username and password used by the agent.
  See "Controlling access to the agent (or console)" on page 146.
- Set up recovery actions to take place if the agent fails to start.
  For example, you can restart the agent automatically or restart the computer (on computers running Windows XP or Windows 2000 only).

See "Setting up recovery actions when the agent fails to start" on page 144.

Best practices for using services

This section suggests some best practices for using services.

Check the Events tab first before using Services

The Events tab in the advanced view of the console should be the first place you check when tracking down the source of a problem, particularly when it is associated with the agent. Selecting the most recent log entries in the Events tab will often give you information and clues as to what is causing the problem.

Verify that the agent is starting without user intervention

When the agent is installed on a computer it is configured to start automatically when the console starts. You may want to test this by opening the console to verify that the agent can start without user intervention (the Status area in the Task pane of the console or when hovering the mouse pointer over the Tray icon will say "Ready" when the agent has successfully started).

You can also test that the agent is starting automatically by looking in Services and checking the status and restarting the service if necessary. If the Startup type is set to automatic, you should try starting the agent again.

See "Starting, stopping, or restarting the agent service" on page 143.

Use caution when changing default settings for the agent

Changing the default settings for services might prevent key services from running correctly. It is especially important to use caution when changing the Startup Type and Log On As settings of services that are configured to start automatically.

Changing the default agent properties may prevent the console from running correctly. In particular, you should use caution when changing the default Startup type and Log On settings of the agent since it is configured to start and (typically) log on automatically when you open the console.

Opening Services

There are several methods you can use to open Services to manage the agent.

To open Services

1 Do one of the following:

- From the **Start** menu on the Windows desktop, click **Settings** > **Control Panel** > **Administrative Tools** > **Services**.
- From Windows XP, click **Start** > **Control Panel** > **Performance and Maintenance** > **Administrative Tools**, then double-click **Services**.
- From the **Start** menu on the Windows desktop, click **Run**. In the Open text field, type **services.msc**, then click **OK**.

2 Scroll the list of services until you see LiveState Recovery (the name of the agent) under the Name column.
Its status should be "Started".
See "Starting, stopping, or restarting the agent service" on page 143.

Starting, stopping, or restarting the agent service

To start, stop, or restart the agent service, you must be logged on as an administrator. (If your computer is connected to a network, network policy settings may prevent you from completing these tasks.)

Some instances of when you may need to start, stop, or restart the agent service include the following:

- Start or Restart: If the console is unable to connect to the agent on a computer or you cannot reconnect from the console by clicking Reconnect in the Task pane or Tray icon.
- Restart: You have just changed the username or password (or both) you use to log on to the agent service, or you used the Security configuration tool to give additional users the ability to back up computers.
  See "Controlling access to the agent (or console)" on page 146.
- Stop: If you believe the agent may be causing a problem on the computer or you want to temporarily free memory resources.
  If you have created a backup job, note that stopping the agent will prevent backup images from being created at the scheduled times you specified.

To start, stop, or restart the agent service

1 From the Services window, under the **Name** column, select **Symantec LiveState Recovery**.
See "Opening Services" on page 143.

2 Click one of the following:

- **Action** > **Start**
- **Action** > **Stop**
- **Action** > **Restart**

Warning: Stopping the agent service will prevent you from creating or restoring backups from the console.

If you stop the agent service, then start the console, the agent will restart automatically and the Status in the Task pane of the console or the Tray icon will indicate that it is “Ready” to perform a task.

If you stop the agent service while the console is open, you will receive an error message and the console will be disconnected from the agent. In most cases, you can click Reconnect from the Task pane of the console or from the Tray icon to restart the agent.

Setting up recovery actions when the agent fails to start

You can specify the computer’s response if the agent fails to start. Recovery actions are available only on target computers that are running Windows 2000 or Windows XP.

To set up recovery actions when the agent fails to start

1 From the Services window, under the **Name** column, select **Symantec LiveState Recovery**.
See “Opening Services” on page 143.

2 Click **Action** > **Properties**, then click the **Recovery** tab.

3 Select the action you want from the **First failure**, **Second failure**, and **Subsequent failures** drop-down lists.

Restart the Service	Specify the number of minutes to pass before an attempt to restart the service is made.
Run a Program	Specify a program to run. You should not specify any programs or scripts that require user input.
Restart the Computer	Specify how long to wait before restarting the computer by clicking Restart Computer Options. You can also create a message that you want to display to remote users before the computer restarts.

4 In the **Reset fail count after** box, specify the number of days that the agent must run successfully before the fail count is reset to zero.
When the fail count is reset to zero, the next failure triggers the action set for the first recovery attempt.
If you want the agent to run correctly for several weeks between failures, you should specify a large number.

5 Click **OK**.

Viewing agent dependencies

The agent depends on other required services to run properly. If a system component is stopped or is not running properly, dependent services can be affected.

If the agent fails to start, check the dependencies to ensure they are installed and that their Startup type (as identified in the General tab) is not set to Disabled.

To view agent dependencies

1 From the Services window, under the **Name** column, select **Symantec LiveState Recovery**.
See "Opening Services" on page 143.

2 Click **Action** > **Properties**, then click the **Dependencies** tab.

The top list box on the Dependencies tab displays services that are required by the agent to run properly. The bottom list box does not have any services that need the agent to run properly.

Table B-1 lists the three services that are required by the Symantec LiveState Recovery agent to run properly, along with their default Startup type setting (as listed in the General tab).

Table B-1 Required services

Service	Startup type
Event Log	Automatic
Logical Disk Manager	Automatic
Remote Procedure Call (RPC)	Automatic

Controlling access to the agent (or console)

You can use the Security Configuration Tool to allow or deny users and groups the necessary rights and permissions to use the Symantec LiveState Recovery agent (or console) from the console or Tray icon.

Table B-2 describes the permissions that can be allowed or denied for user and groups in using the agent:

Table B-2 Permission options

Help option	Description
Full Control	Users or groups can control (start, stop, restart) the agent from the console or Tray icon. (Controlling the agent determines whether users or groups can manage backup jobs.) By default, the Administrators group has full control permissions.
Status Only	Users or groups can get status information of the agent. By default, the Users group has status only permissions.

A deny setting takes precedence over an inherited allow setting. For example, a user that is a member of two groups is denied permissions when specified settings for one group denies permissions even though another group allows permissions. User denied permissions override group allow permissions.

Note: After changing security configurations, the Symantec LiveState Recovery agent must be restarted.

See "Starting, stopping, or restarting the agent service" on page 143.

See "Managing the agent using Windows Services" on page 141.

Control access to the agent (or console)

You can add additional users and groups, remove a user or group, or run the console using different user rights.

To add additional users and groups

1. On the Windows Start menu, click **Programs** > **Symantec LiveState Recovery** > **Security Configuration Tool**.
2. Click **Add**.
3. In the Select Users or Groups dialog box, click **Advanced**.
4. If necessary, click **Object Types** to select the types of objects you want.

5 If necessary, click **Locations** to select the location you want to search.

6 Click **Find Now**, then select users and groups you want, then click **OK**.

7 Click **OK** when you are finished selecting users and groups.

To change permissions for a user or a group

1 On the Windows Start menu, click **Programs** > **Symantec LiveState Recovery** > **Security Configuration Tool**.

2 In the Permissions for Symantec LiveState Recovery dialog box, select the user or group whose permissions you want to change, then set the permissions:

- To set Full Control permissions, click **Allow** or **Deny** for the selected user or group.
- To set Status Only permissions, click **Allow** or **Deny** for the selected user or group.

3 Click **OK** when you are finished.

To remove a user or group

1 On the Windows Start menu, click **Programs** > **Symantec LiveState Recovery** > **Security Configuration Tool**.

2 Select a user or group you want to remove, then click **Remove**.

3 Click **OK** when you are finished.

Running the console using different user rights

If the permissions for a user are insufficient for running the console, you can use the Run As feature in Windows to run the console using an account that has sufficient rights, even if you are not currently logged in with the account.

Run the console using different user rights

You can perform Run As from Windows XP or Windows 2000 Professional.

To perform Run As from Windows XP

1 On the Windows Start menu, click **Program Files** > **Symantec LiveState Recovery**.

2 Right-click **LiveState Recovery Advanced Server** (or **LiveState Recovery Standard Server**), then click **Run As**.

3 Click **The following user** to log onto the console using another account.

4 Type the account name and password that you want to use in the User Name and Password text fields.

5 Click **OK**.

To perform Run As from Windows 2000 Professional

1 On the Windows Start menu, click **Program Files** > **Symantec LiveState Recovery**.

2 Press **Shift** and right-click **LiveState Recovery Advanced Server** (or **LiveState Recovery Standard Server**).

3 Click **Run As**.

4 Click **Run the program as the following user** to log on to the console using another account.

5 Do one of the following:

- Type the account name, password, and the domain that you want to use in the User name, Password, and Domain text fields.
- If you want to use the Administrator account on the computer, type the name of the computer in the Domain text field.
- If you want to run as a domain administrator, type the name of the domain in the Domain text field.

6 Click **OK**.

Glossary

Active Directory	The directory service that stores information about objects on a network and makes this information available to users and network administrators. Active Directory gives network users access to permitted resources anywhere on the network using a single logon process. It provides network administrators with an intuitive, hierarchical view of the network and a single point of administration for all network objects.
backup image	An exact copy of a drive (either containing data or the operating system) that is usually compressed and stored as a file. Both full backups (used stand-alone) and baseline backups (used with incremental backups) have a .v2i (Virtual Volume Image) file extension. The backup image includes all the data (operating system, applications, data, and settings) needed to restore the drive to the state it was in when the backup was performed. Backup images are what you use to restore files and folders or an entire drive. A backup image is also sometimes known as an image, backup, or backup set. You can view the contents of a backup image file using Backup Image Browser.
bare metal recovery	The complete recovery of a computer after a catastrophic hard disk failure. It includes the restoration of the operating system, file system, partitions, volumes, and data, from a complete backup image.
basic disks	A hard disk that can be accessed by DOS and Windows. Basic disks can have up to four primary partitions, or three primary partitions and one extended partition. Within an extended partition you can create unlimited additional subdivisions called logical partitions.
cluster	The smallest allocation unit in the FAT, FAT32, and NTFS file systems. One cluster consists of a fixed number of disk sectors.
delayed apply	Restoring an operating system partition by starting the restore in the console (using the Restore Drive Wizard), then finishing the restoration after booting into the recovery environment. An alternate method is to boot into the recovery environment and use the System Restore Wizard to perform the restoration.
drive lock	A request by the software for exclusive use of a selected drive before making any modifications to the file system of the hard drive. By locking down a drive, you prevent other software programs from changing the file system while the product is trying to change it. This ensures that any data on the drive is current and accurate at the time of restoration.

dynamic disks A hard disk that contains volumes (or drives) that span multiple hard disks. Dynamic disks, which are managed by Windows Disk Management tool, do not contain partitions or logical drives and cannot be accessed by DOS.

extended partition A special kind of primary partition that was developed to overcome the four- partition limit. The extended partition is a container inside of which you can create logical partitions. The extended partition itself does not hold any data, nor is it assigned a drive letter. But logical partitions inside the extended partition can hold applications and data and are assigned drive letters.

hot backup A backup image taken in real-time without interrupting system operation on the computer.

hot restore The restoration of a backup image while the computer remains up and running. You can perform hot restores of data or applications with the product. Performing a hot restore of an operating system partition is not available. (See delayed apply.)

image See backup image.

image set If you use a base image and incrementals to back up a drive, the combination of the base image and incrementals is called an image set. When you restore to a given point in time, the base image and all the incrementals taken up to that point in time are used for the restore. It is important that all the files in an image set (the base image and all the incrementals) are in the same directory. If any piece is missing, the backup is invalid and you will not be able to restore the data.

incremental backup Backup image set consisting of a base backup image file (.v2i) and incremental backup image files (.iv2i). Incremental backup images contain a snapshot of the sectors that have changed on a drive since the base backup or the last incremental backup was taken. Incremental backups are faster to create and require less drive space than full backups, so they are useful if you want to back up your drive more often without using a lot of time or drive space. Incremental backup image files can also be consolidated. When you restore a drive (or files and folders) to a point in time, the base image and the incrementals up to that point in time are used for the restore. For example, if you took a base backup image on Friday night and an incremental backup image on Wednesday morning, later you could restore files, folders, or an entire drive from the base and incremental backups. To restore the backup image, the base image and all the incrementals files in the backup image set must be in the same directory and should not be deleted.

index file An index file that is saved as part of a backup set to ensure that the base backup and the incremental backups are correctly associated with one another. The .sv2i file must be in the same directory as the .v2i and .iv2i files to ensure that backups can be restored.

.iv2i See incremental backups.

logical partition a) A contiguous area inside an extended partition that can be used by the operating system to store and retrieve files. The operating system typically assigns a letter (for example, D:, E:) to the logical drive.

b) Any partition, CD, or other storage device that contains a file system and is assigned a drive letter.

mount a volume The ability to see and use a volume within a backup image that is physically located somewhere else on the network. The volume has a drive letter assigned to it, so it looks like it is a part of the local computer system. Though a mounted volume is read-only, you can open files and folders, scan for viruses, and even run some executables from within a mounted volume.

primary partition A partition referenced in the master boot record (MBR) partition table. Only four primary partitions can exist on a hard disk. One of these may be an extended partition. Only one primary partition on a drive may be active at a time. When one primary partition is active, the other primary partitions are typically not accessible. Data and programs are often placed on a logical partition inside an extended partition. This enables the data to be accessed by all primary partitions.

protect drive Protecting a drive means the drive is placed under the full-time protection of the agent. When you protect a drive, you are specifying a schedule for creating consistent backup images, the backup image storage location, and any backup storage options you want.

recovery environment See Symantec Recovery Disk.

remote computer A computer that is physically located somewhere else on a network but is accessible from a local computer.

service A program, routine, or process that performs a specific system function to support other programs, particularly at a low (close to the hardware) level. The Symantec LiveState Recovery agent is an example of a service.

.sv2i See index file.

Symantec Recovery Disk A graphical, secondary boot environment (or operating system) that gives you the minimal functionality needed to access backup image files on your network and restore them. This environment is typically used when a drive cannot be restored from within Windows or when the computer has suffered a catastrophic failure and you need to restore the entire hard drive.

The Symantec LiveState Recovery product CD is used both to install the product and to boot a computer into the recovery environment, known as Symantec Recovery Disk. Be sure you store the CD in a safe place.

See "How does Symantec Recovery Disk work?" on page 118.

UNC (Universal Naming Convention)	A method used to identify folders, files, and programs on a network computer. A UNC path begins with two backslashes \\ and is followed by the server name, the share name, and usually the directory and/or the filename. For example, \\server_name\share_name\backup_name.v2i
.v2i	See backup image.

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